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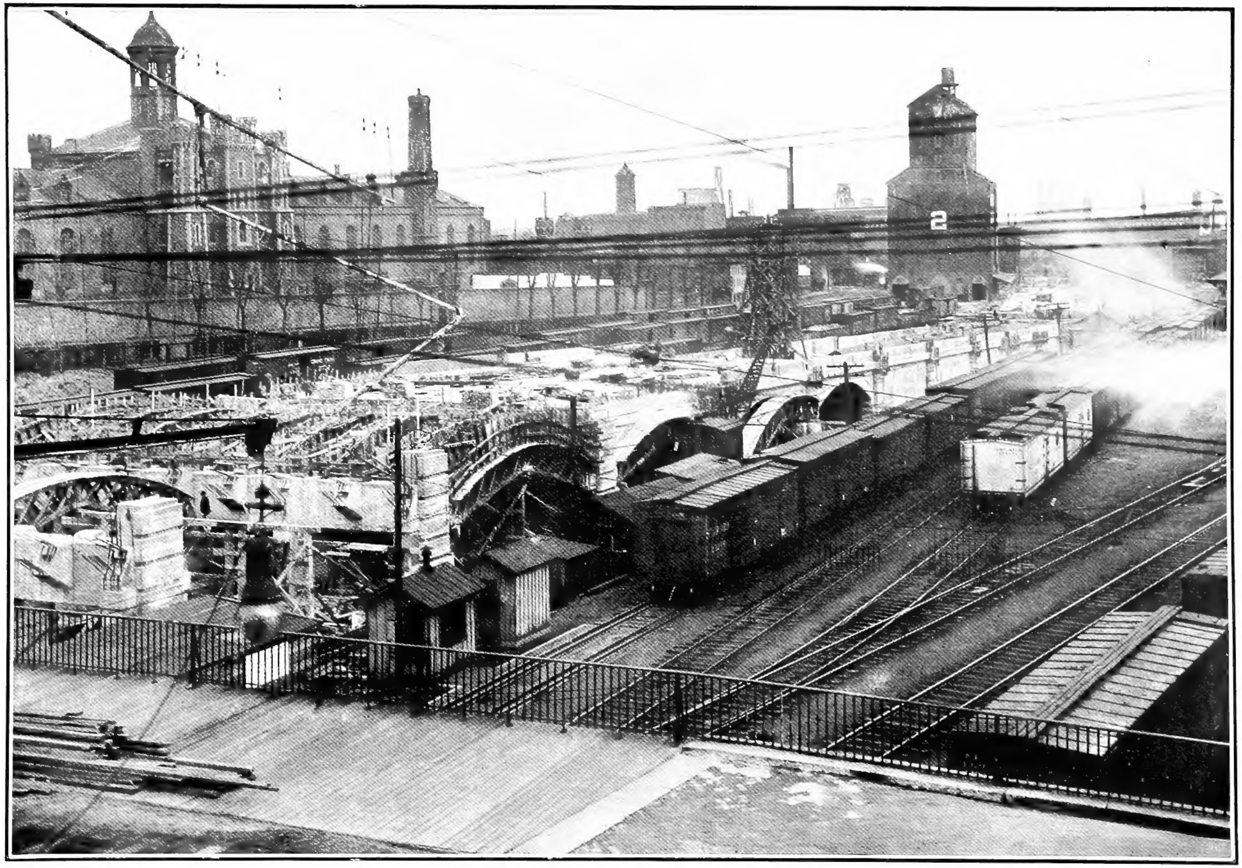
Annual Report
of the
Sewerage Commission
of the
City of Baltimore

1913

BALTIMORE
MEYER & THALHEIMER
CITY PRINTER

1914



FALLSWAY VIADUCT.

Looking South From Eager Street Bridge, Showing Retaining Walls Completed, and Forms for Arch Ribs of One Span Ready for Concreting. The Concrete Was Mixed at a Central Point and Was Distributed From the Top of a Tower 208 Feet High, Through Steel Troughs Suspended From Cables, as Shown in the Upper Left-Hand Corner.

SEWERAGE COMMISSION

OF THE

CITY OF BALTIMORE

AMERICAN BUILDING

BALTIMORE, December 31, 1913.

HON. JAMES H. PRESTON,

Mayor of Baltimore.

SIR:

In accordance with Section 1, Chapter 349, Acts of the General Assembly of Maryland, 1904, which requires the Sewerage Commission to annually make to the Mayor a detailed statement of its work and expenditures, we beg to submit the following report:

The death of Mr. William D. Platt, on December 23, 1913, deprived the Commission of a most useful member, and the City of a faithful servant. He was one of those originally appointed by the Mayor of Baltimore, June 19, 1905, and upon the organization of the Commission was elected vice-chairman. In the performance of all his duties he was faithful and efficient, and because of his many estimable traits he was highly esteemed by his colleagues.

On December 31, 1913, Thomas J. Shryock was appointed to fill the vacancy caused by the death of William D. Platt.

ACCOUNTS AUDITED.

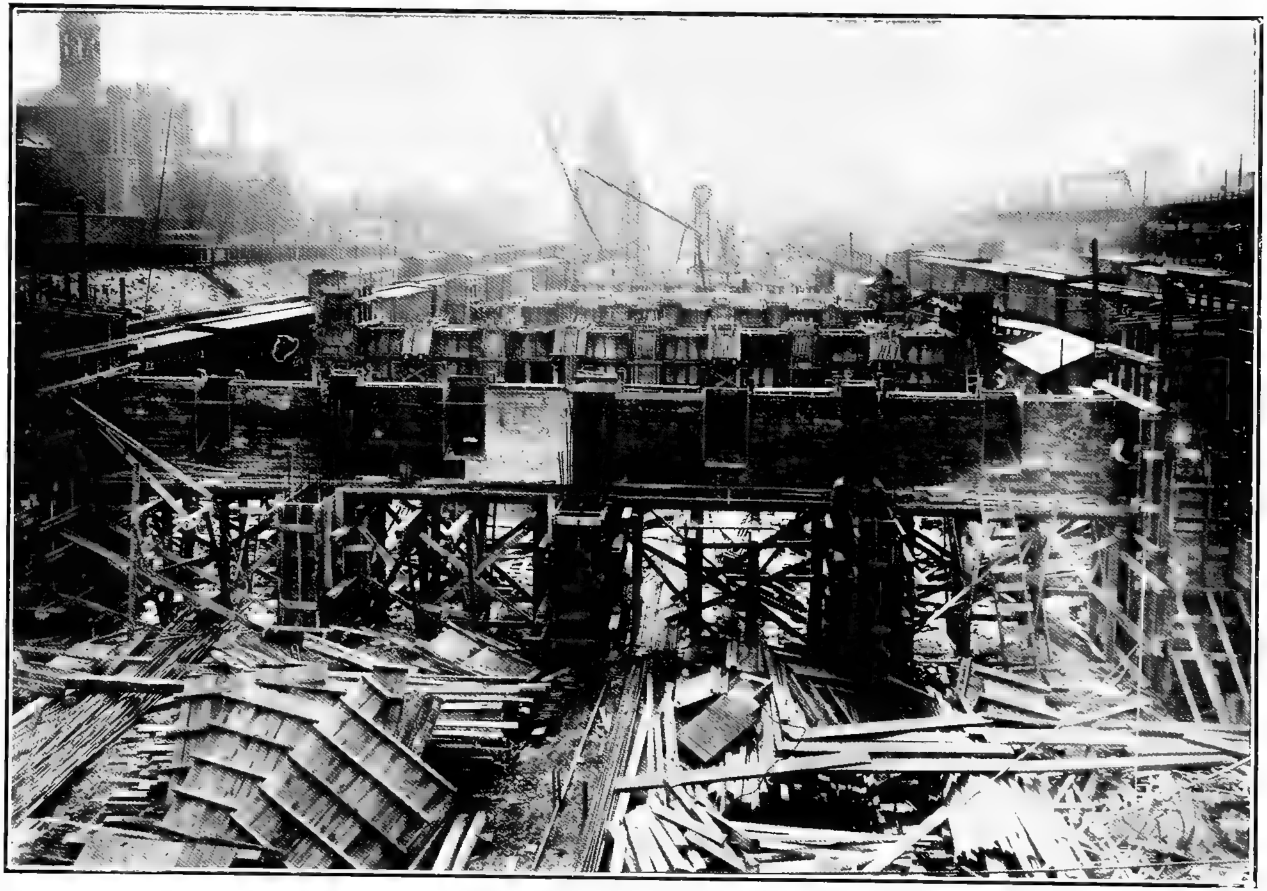
The books, accounts and vouchers of the Commission have been examined by the Baltimore Audit Company, from the date that the last report was submitted to you to the close of business December 31, 1913. The Audit Company reported that they had examined the books and accounts for 1913, which included the examination of original vouchers at the Comptroller's office in the City Hall, and are pleased to state that everything is correct.

EXPENDITURES, 1913.

A complete and detailed statement of disbursements for the year 1913 has been furnished the City Comptroller, as follows:

Administrative salaries	$27,773 19
Construction salaries	239,812 31
Pumping Station salaries	16,643 51
Disposal Plant salaries	22,014 02
Cement Laboratory salaries	6,042 86
Repairing and Cleaning Sewers salaries	12,035 15
Pumping Station expenses	10,625 00
Disposal Plant expenses	5,993 16
Cement Laboratory expenses	705 46
Repairing and Cleaning Sewers expenses	259 34
Special expenses	35,641 23
Construction	3,712,891 50
Amount expended in 1913	$4,090,436 73

The items, Salaries and Expenses of the Pumping Station, Disposal Plant and Repairing and Cleaning Sewers, aggregating $67,570.18, are in fact maintenance cost. As a large number of taxpayers are being served by their operations, these expenses should not be considered in connection with construction.



FALLSWAY VIADUCT.

Looking South From Eager Street Bridge, Showing Form Work for Pier Girder. The Form for the South Side of the Girder, Including the South Skewbacks, Was in Place, But the Form for the North Side Was Not Set Up Until After the Reinforcing Steel Was Erected.

The details of the construction represented by this large sum are given in the report of the Chief Engineer, submitted herewith. The accomplishment of so much work under varying conditions and many obstacles, is evidence of the high efficiency of the Engineering Department, and also entitles the employes of the Administrative Department to much credit for their accuracy and promptness in handling the accounts and vouchers, as stated in the report of the Audit Company.

CONTRACTS LET IN 1913.

Sanitary Contract No. 107, Frank Bruno & Co.	$118,893	52
Sanitary Contract No. 108, W. H. Thompson Cons. Co.	19,833	20
Sanitary Contract No. 109, Carozza, Lavezza & Carozza.	97,702	43
Sanitary Contract No. 110, McCarthy & O'Herron.	147,768	94
Storm-water Contract No. 26, McCarthy & O'Herron.	258,222	45
Storm-water Contract No. 27, Ryan & Reilly.	39,610	05
Sanitary Contract No. 111, Middleton-Thompson Co.	157,763	40
Sanitary Contract No. 114, C. B. Clark & Co.	100,162	40
Sanitary Contract No. 115, Carozza, Lavezza & Carozza.	26,042	49
Sanitary Contract No. 116, Gallagher, Boyle & Bryan.	190,001	80
Storm-water Contract No. 28, Guild & Co.	97,993	10
Storm-water Contract No. 29, Whiting-Turner Cons. Co.	12,262	00
Sanitary Contract No. 117, W. H. Thompson Cons. Co.	51,658	75
Sanitary Contract No. 118, McCarthy & O'Herron.	77,069	70
Sanitary Contract No. 121, Whiting-Turner Cons. Co.	65 868	50
Storm-water Contract No. 30, McCarthy & O'Herron.	93,916	75
Sanitary Contract No. 113, John Dannini.	2,035	73
Storm-water Contract No. 31, Ryan & Reilly.	31,382	90
Sanitary Contract No. 120, Whiting-Turner Cons. Co.	55,947	50
Storm-water Contract No. 32, Guild & Co.	26,805	20
Sanitary Contract No. 119, Gallagher, Boyle & Bryan.	176,154	75
Sanitary Contract No. 122, James Ferry & Sons.	52,426	90
Storm-water Contract, No. 33, Ryan & Reilly Co.	103,303	20
Sanitary Contract No. 124, Carozza Brothers Co.	80,552	25
Storm-water Contract No. 34, James Ferry & Sons.	7,242	50
Sanitary Contract No. 112, Samuel T. Williams.	9,092	00
Sanitary Contract No. 128, McCarthy & O'Herron.	138,637	85
Total.	$2,238,350	26

DISPOSAL PLANT.

From time to time we have conferred with our Consulting Engineers as the work has progressed. As the Disposal Plant has only been put in operation to a limited extent, we thought it wise during the past year to have Mr. Rudolph Hering visit the plant and study its operation. He spent some time in making a thorough investigation of the problem presented, and has made a number of valuable suggestions, which either have been or will be acted upon. It is to be borne in mind that the highest degree of efficiency of the Disposal Plant is not likely to be reached until a larger proportion of the sewage of the City shall have been brought into treatment.

SLUDGE DISPOSAL.

In our last annual report reference was made to the possibility of the use of sludge as a fertilizing material. This question is still under investigation, and it is hoped that before long we shall have sufficient data to enable us to form a definite opinion on the subject. There is no doubt that sewage contains substances that are of importance in the cultivation of the soil; but it remains to be determined whether these can be separated from the sewage in sufficiently concentrated form at a sufficiently low cost to give them commercial value.

APPROPRIATIONS FOR FUTURE WORK.

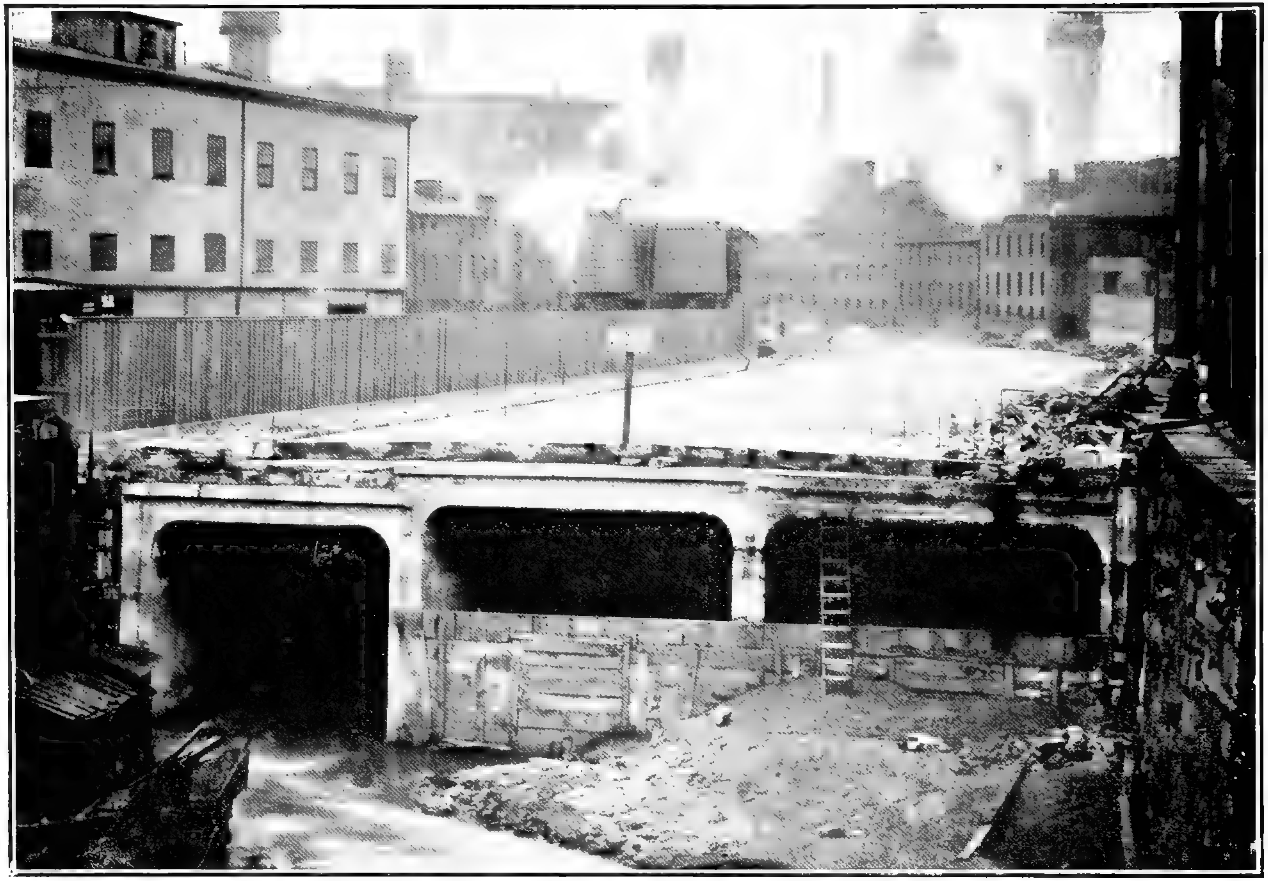
The appropriation for sewer work for the year 1914 will exhaust the funds provided under the Sewerage Enabling Acts of 1904 and 1910. These two loans were intended to provide $20,000,000, but because the Sewerage Stock could not be disposed of at par at a rate of interest most advantageous to the City, the sum actually available for all purposes will be approximately $18,900,000. Nevertheless, the two loans would be sufficient to do the work of sewering and draining the built-up portions of the City and Annex, existing at the time the first estimates were made. These estimates will be found in the annual report of the Commission for 1907, which stated that the cost of the sanitary sewers as outlined in the report for 1906 would be about $14,000,000, and that the entire storm-water system could be properly constructed for about $4,500,000. These estimates were based upon a system of sewers designed to use the streets and alleys bringing a connection to every house in the City in such a way as to reduce the total number of miles of sewers to a minimum. The Legislature of 1910 passed an Act requiring the Commission to lay sewers in the alleys wherever practicable. It is estimated that this requirement increases the cost of the system about $1,000,000. When the first estimates were made, it was understood that the work of the Commission would stop at the outside building line. It has since been decided to carry the front connection to the inside of the wall of the building, enabling the owners of small properties to connect their buildings with the City's sewers at less cost to them, adding to the cost of the system for this item approximately $250,000. These changes, with the discounts on sales of Sewerage Stock, have reduced the amount considered available for construction of the sanitary and storm-water systems as contemplated in the original estimates, making the extension of sewers in the rapidly developed outlying portions of the City a serious problem with which to deal. The Commissioners for Opening Streets during the year made request for drainage construction in streets outside of the territory included in the original plan. The City Solicitor had advised them that the Act placed on the Sewerage Commission the duty of providing for the sewerage and drainage in connection with the new streets in the Annex. The Sewerage Commission was obliged to inform the Commissioners for Opening Streets that a certain amount of work had been planned in the built-up sections of the City which would exhaust all of the remaining funds. Moreover, it would be most unfair to the taxpayers residing in the congested section of the City, who had been paying taxes for years, to go into the outlying parts where houses were few and far between and expend the money remaining at our disposal for drains, thus depriving the crowded sections of the City of much-needed sewerage privileges. In order to provide sewers and drains for these outlying districts, a further appropriation will be necessary to replace the funds the Commission was deprived of by shrinkage in the amount available on account of the above items. It is safe to say that the work can be brought to a state that might be called practical completion, with the further appropriation of $3,000,000. It appears to the Commission that the extension of the sewers can be done more economically and promptly by the present organization (both administrative and engineering) than later on taking it up under a new organization.

Respectfully,

CHARLES ENGLAND, *Chairman.*
JAMES H. PRESTON, *Ex officio.*
MORRIS WHITRIDGE.
IRA REMSEN.
WILLIAM B. KINES.
GUSTAV SIEGMUND.
THOMAS J. SHRYOCK.

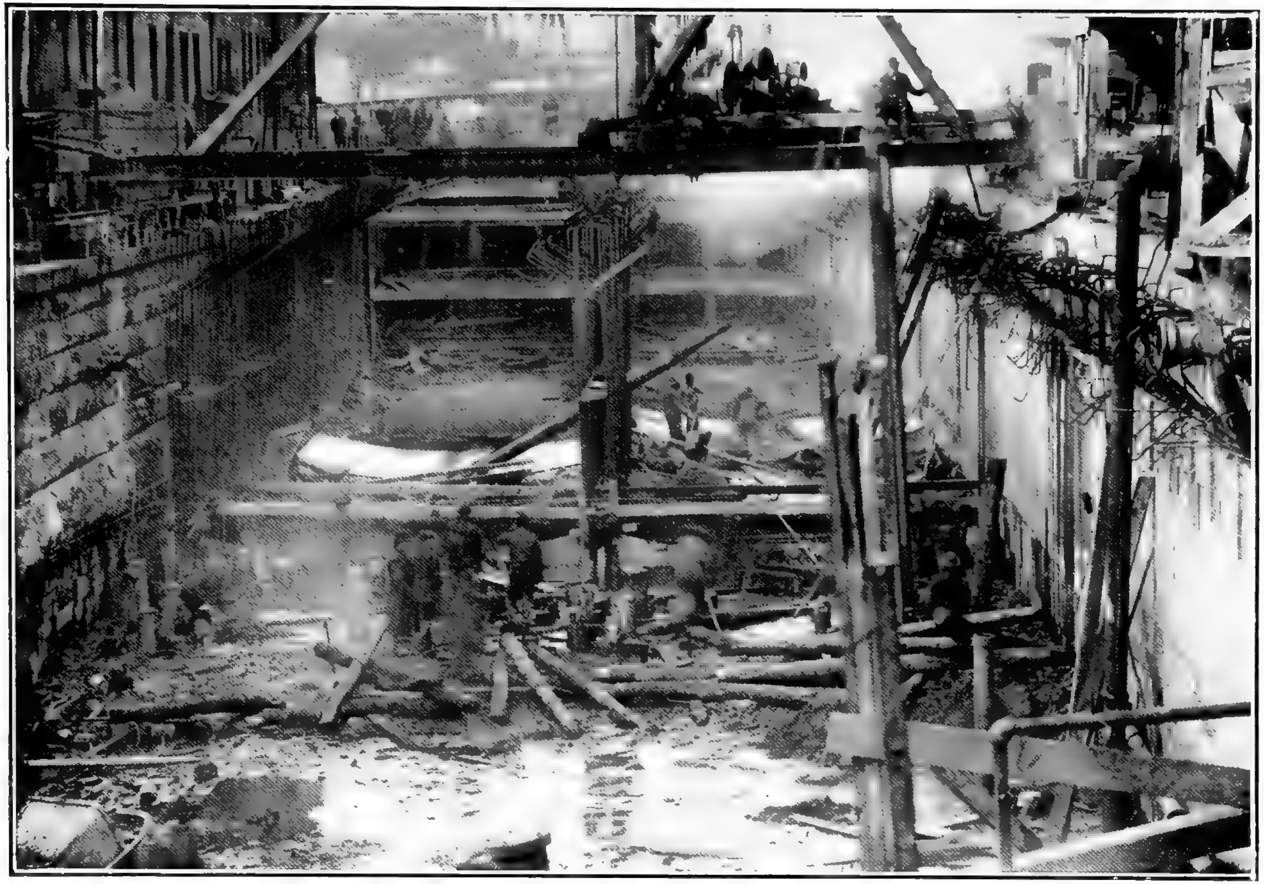
HARRY W. RODGERS, *Secretary.*

JONES' FALLS CONDUITS, SECTION No. 1.
Official Inspection of the Center Conduit After Completion.

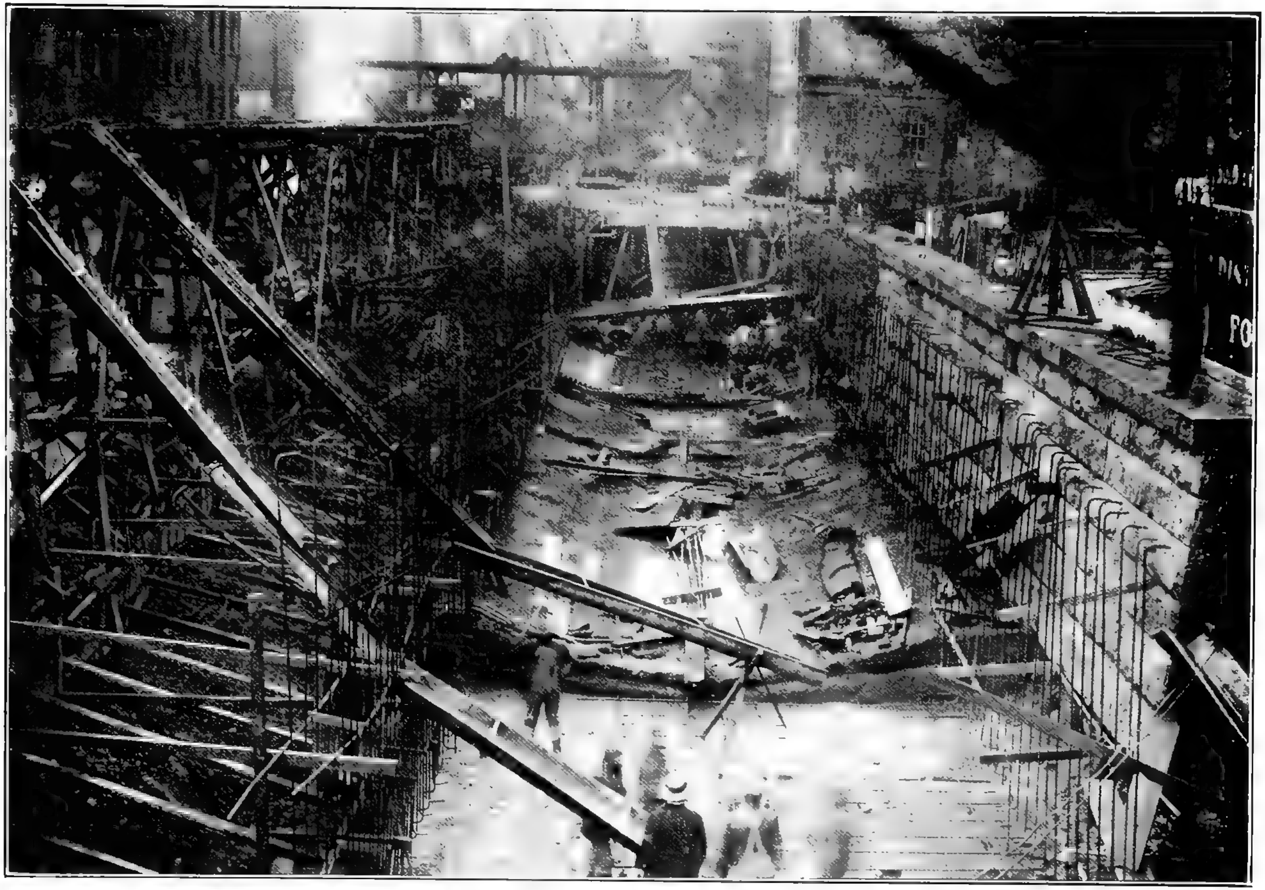


JONES' FALLS CONDUITS, SECTION No. 1.

Northerly End of Section No. 1, After Completion, Showing Paving of Fallsway. The Entire Dry-Weather Flow of Jones' Falls Is Diverted Into the East Conduit.

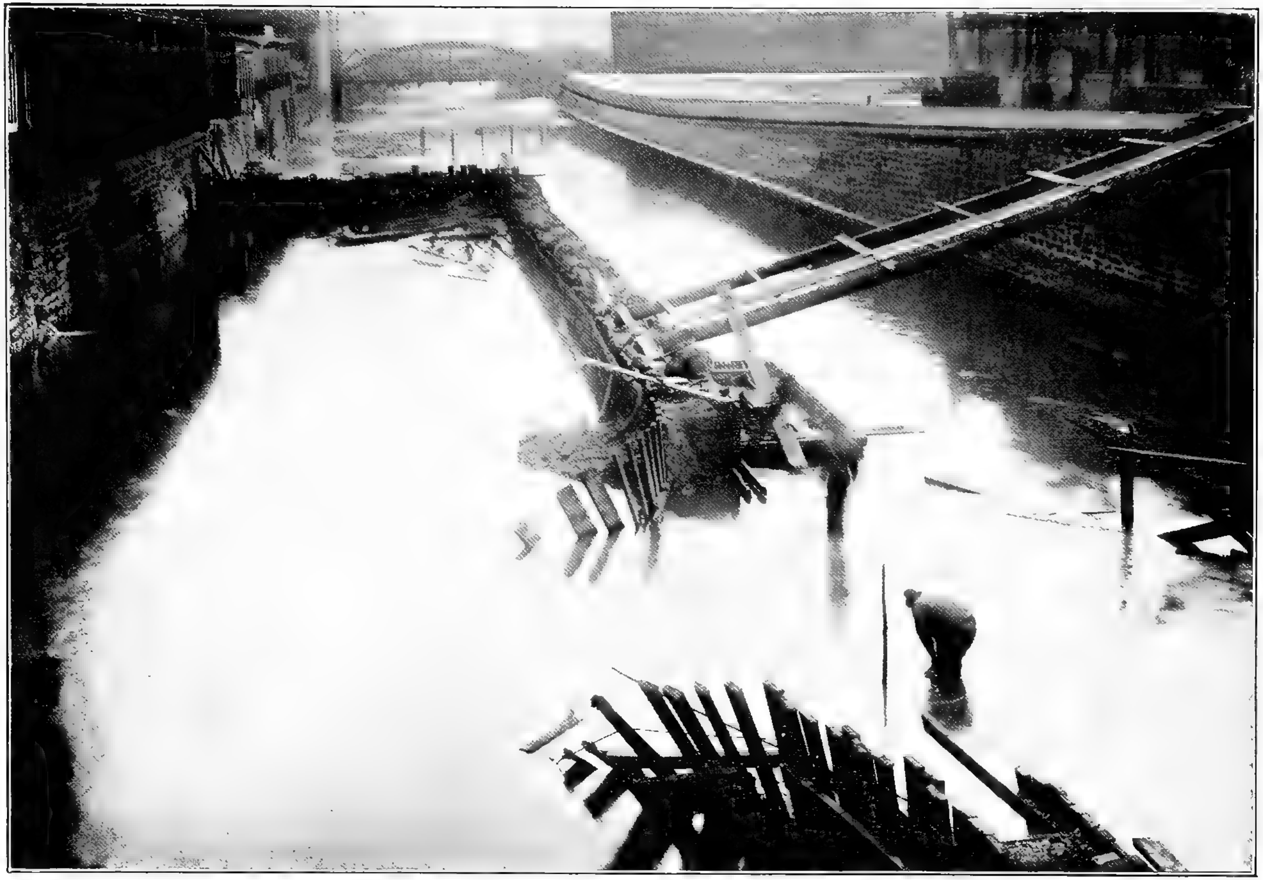


JONES' FALLS CONDUITS, SECTION No. 1.
Driving Piles for Foundations of Center and West Conduits, Just North of Fayette Street.

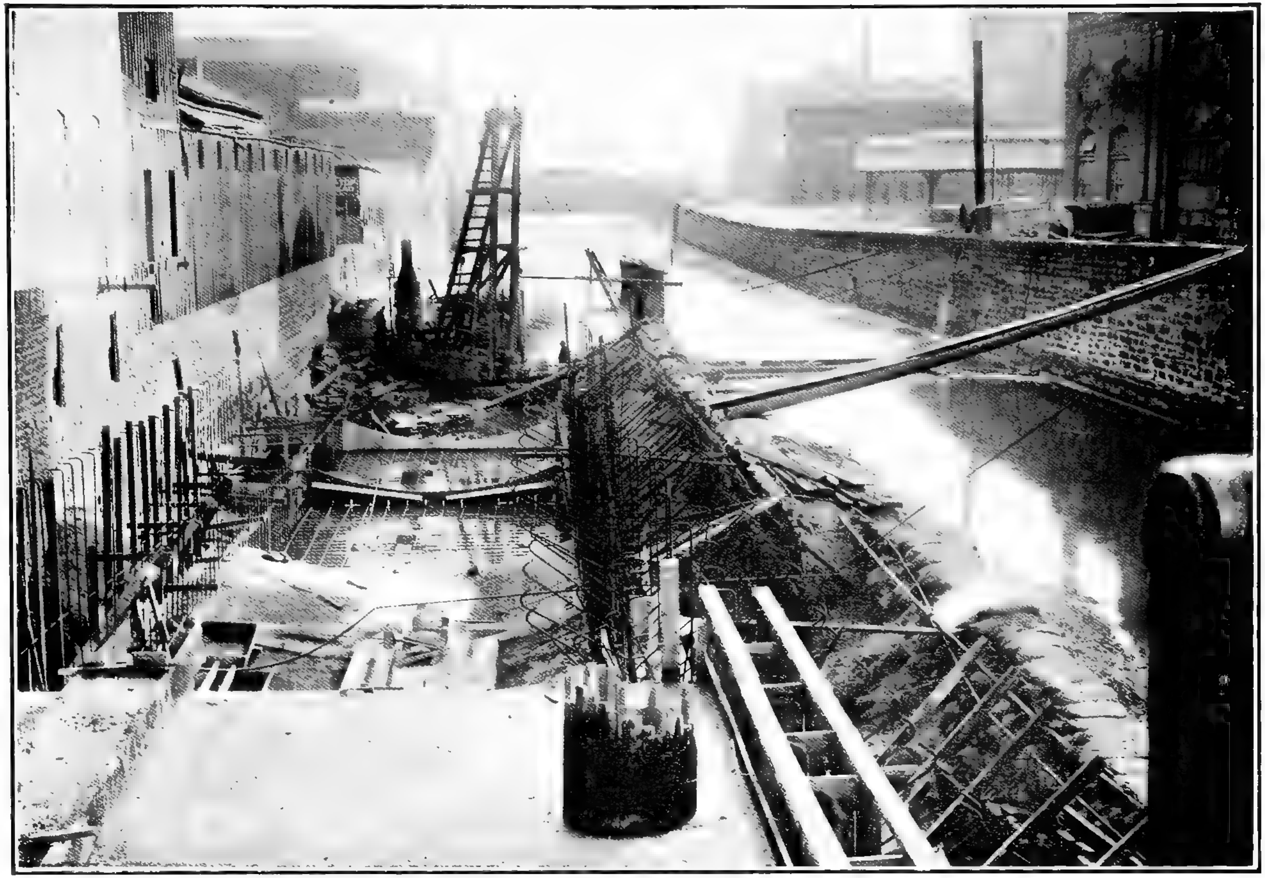


JONES' FALLS CONDUITS, SECTION No. 1.

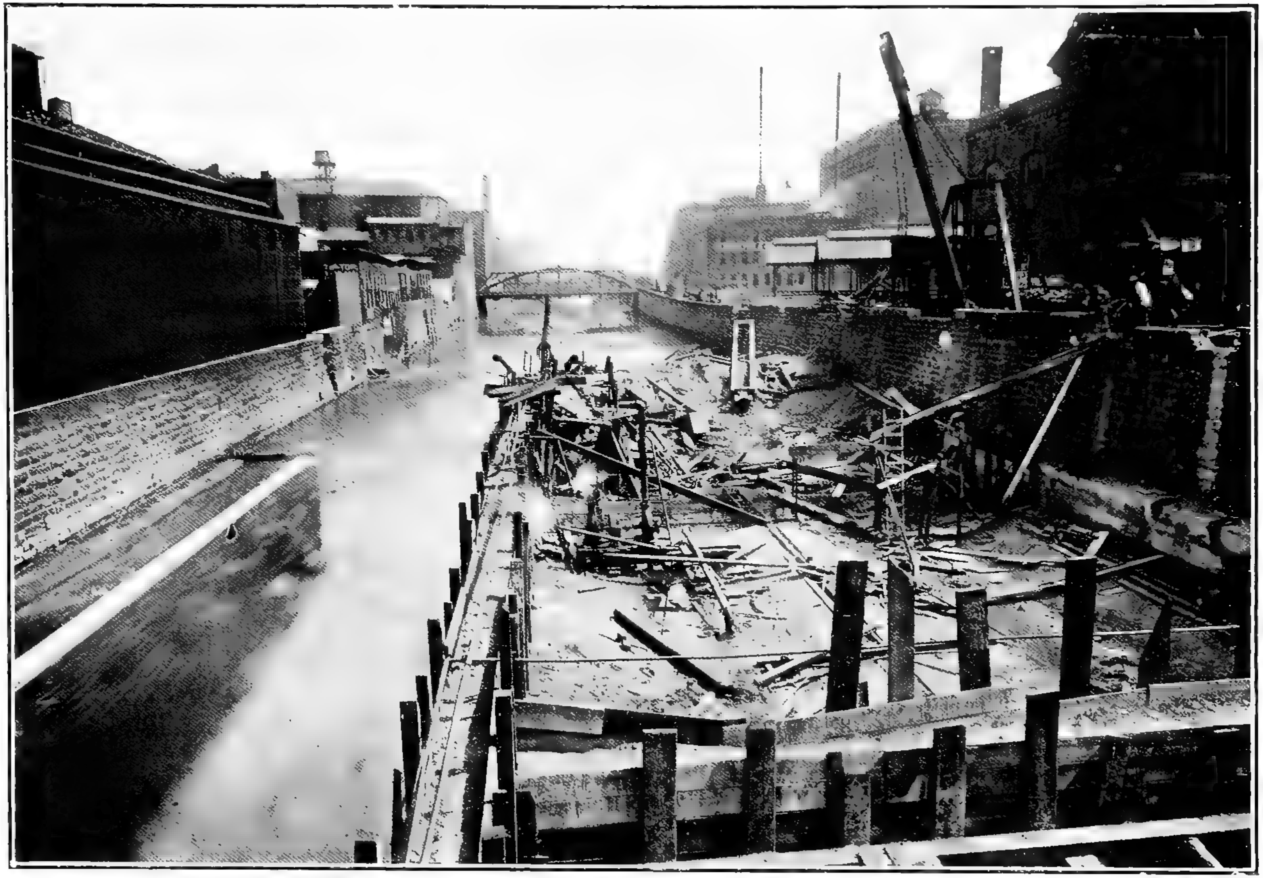
Looking North From Baltimore Street, Showing the Completed Invert of the East Conduit. The Concrete Mixer Was Located at Baltimore Street, Where Materials Could Be Delivered by Teams, and the Concrete Was Distributed Along the Line of Work in Specially Designed Hopper-Bottom Cars, Running on the Trestle Shown.



JONES' FALLS CONDUITS, SECTION No. 1.
Looking South From Baltimore Street, Showing Cofferdam Under Construction at the Mouth of the East Conduit.



JONES' FALLS CONDUITS, SECTION No. 1.
Looking South From Baltimore Street, Showing East Conduit Under Construction.



JONES' FALLS CONDUITS, SECTION No. 1.

Looking South From Baltimore Street. The Inverts of the Conduits Are Extended Beyond the Side Walls for a Distance of About 100 Feet, in Order to Protect the Bottom From Scour. This View Shows the Invert Extension of the East Conduit Completed and the Extension of the Inverts of the Center and West Conduits Under Construction.

ANNUAL REPORT
OF THE
CHIEF ENGINEER
FOR THE YEAR 1913

BALTIMORE, December 31, 1913.

MR. CHARLES ENGLAND, *Chairman; and*
Gentlemen of the Sewerage Commission.

DEAR SIRS:

I have the honor to present to you a report upon the work done by the Engineering Department of the Commission from January 1, 1913, to December 31, 1913.

The total value of the work completed during the year was about $3,875,000. This embraces 139 miles of sewers, drains and house-connections, varying in size from 5 inches to 29 feet in diameter, in the beds of the streets and alleys of the City, and 1,541 catch-basins, and includes such work as the enclosing of Jones Falls, the diversion tunnel under Guilford avenue, the large 12x18-foot storm-water drain in Linwood avenue, and 18 acres of extensions and improvements to the Disposal Plant.

The difficulties and details necessary in constructing this amount of sewers and drains, in streets and alleys filled with all kinds of obstructions, is difficult to make clear to a layman, but is fully appreciated by engineers.

The sewer construction in Baltimore is further greatly complicated because of the Enabling Act requiring all sewage to be purified, necessitating the separating of the storm-water from the sanitary sewage, thereby requiring the building of two separate systems of sewers and drains, crossing and recrossing each other in thousands of places. The supporting of buildings and taking care of the surface drainage and traffic is also a difficult problem, considering the scope of the work. The number of complaints, compared to the amount of work, shows that the work has been carried on with the minimum amount of interference with corporations, other City Departments, property-holders and traffic. The few law suits that have been instituted against the City, in connection with our work, have resulted in the City winning practically all of the cases, with one or two small exceptions.

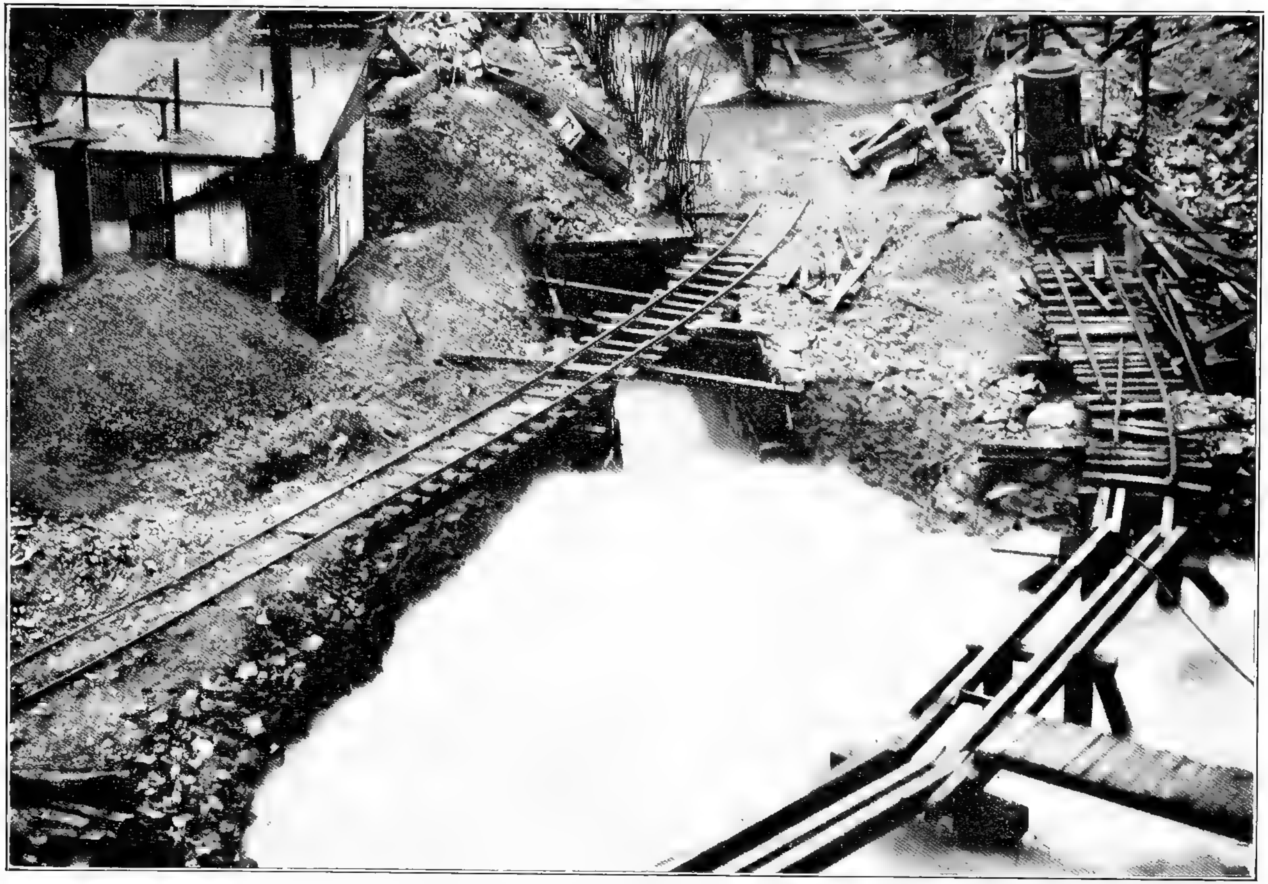
JONES' FALLS.

The construction of the Jones' Falls Conduits has been completed from 100 feet south of Baltimore street, at which point the drainage problem has been solved, to the chamber at the entrance to the tunnel between Biddle and Chase streets, a distance of 5,484 feet, redeeming 428,300 square feet of land in the heart of the City, eliminating ten street bridges and one double-track railroad bridge and making possible the redemption of 175,000 additional square feet of land and the elimination of two additional railroad bridges.

This work, being in the bed of a running stream, subject to sudden floods, has been a most trying piece of construction, and it is therefore with considerable gratification that I am able to report it has been completed without law suits or serious loss to the contractor.

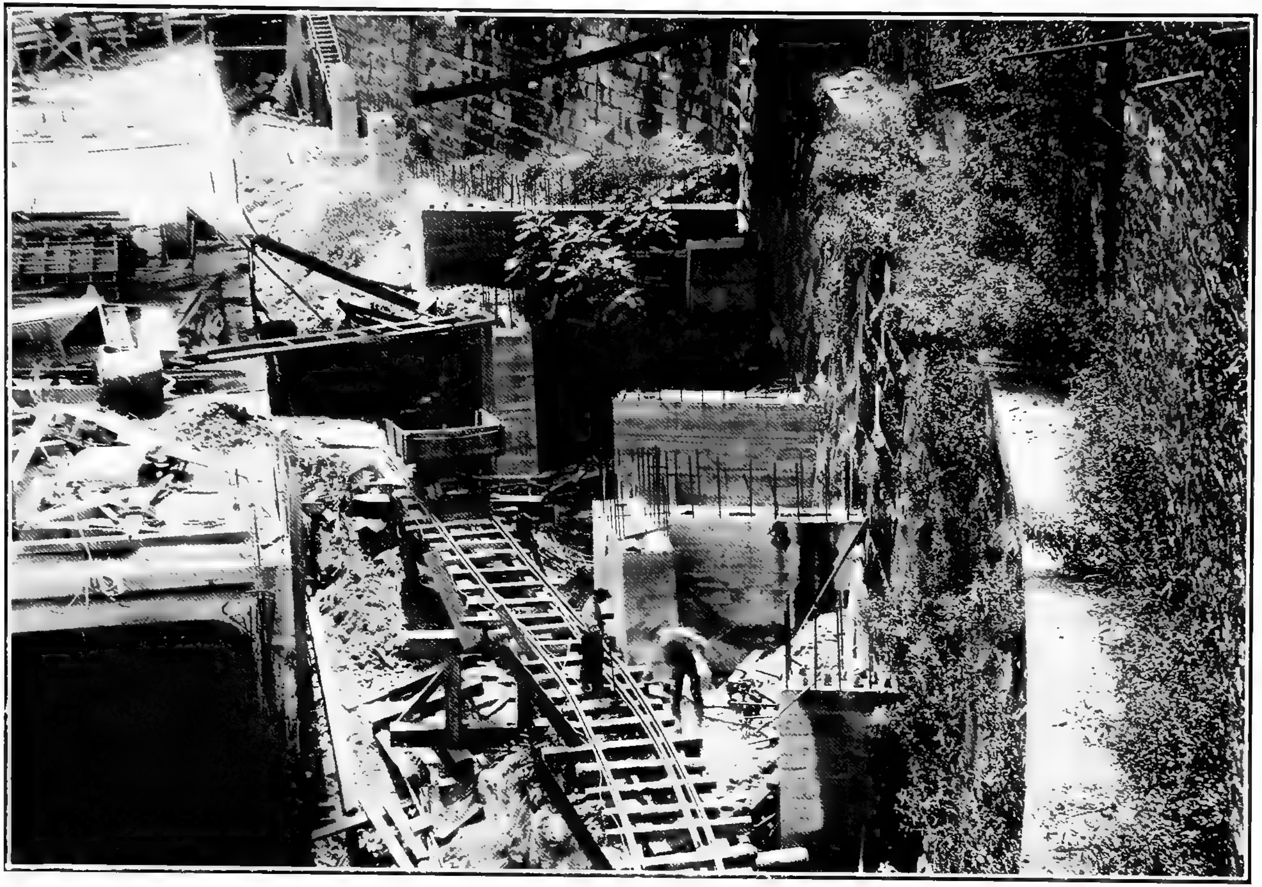
DIVERSION TUNNEL UNDER GUILFORD AVENUE.

The diverting of the Falls at a point in front of Union Station into a 29-foot tunnel under Guilford avenue, effected a very large saving by eliminating the long bend in the Falls,



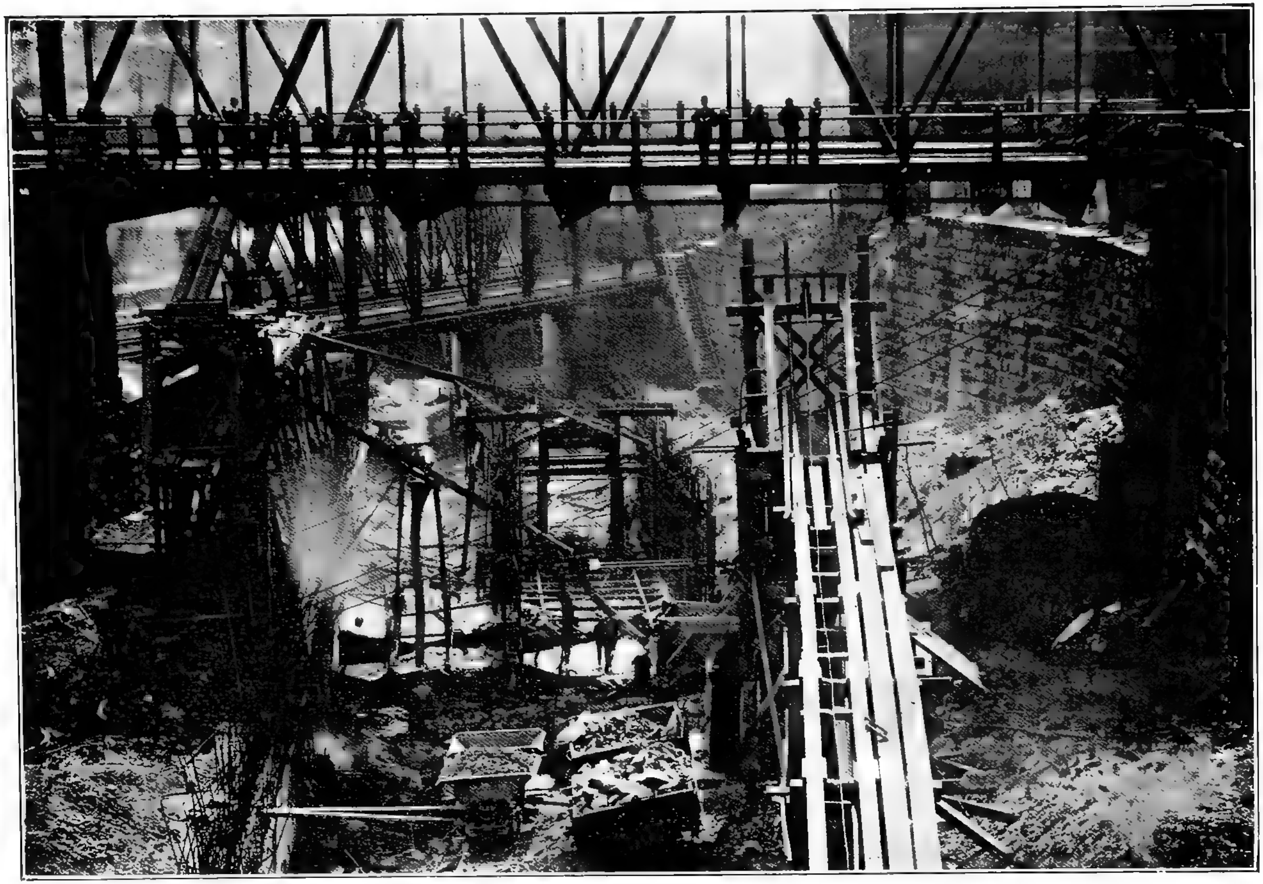
JONES' FALLS CONDUITS, SECTION No. 2.

Looking South From Biddle Street, Showing the Entire Flow of Jones' Falls Diverted Into the East Conduit During High-Water.



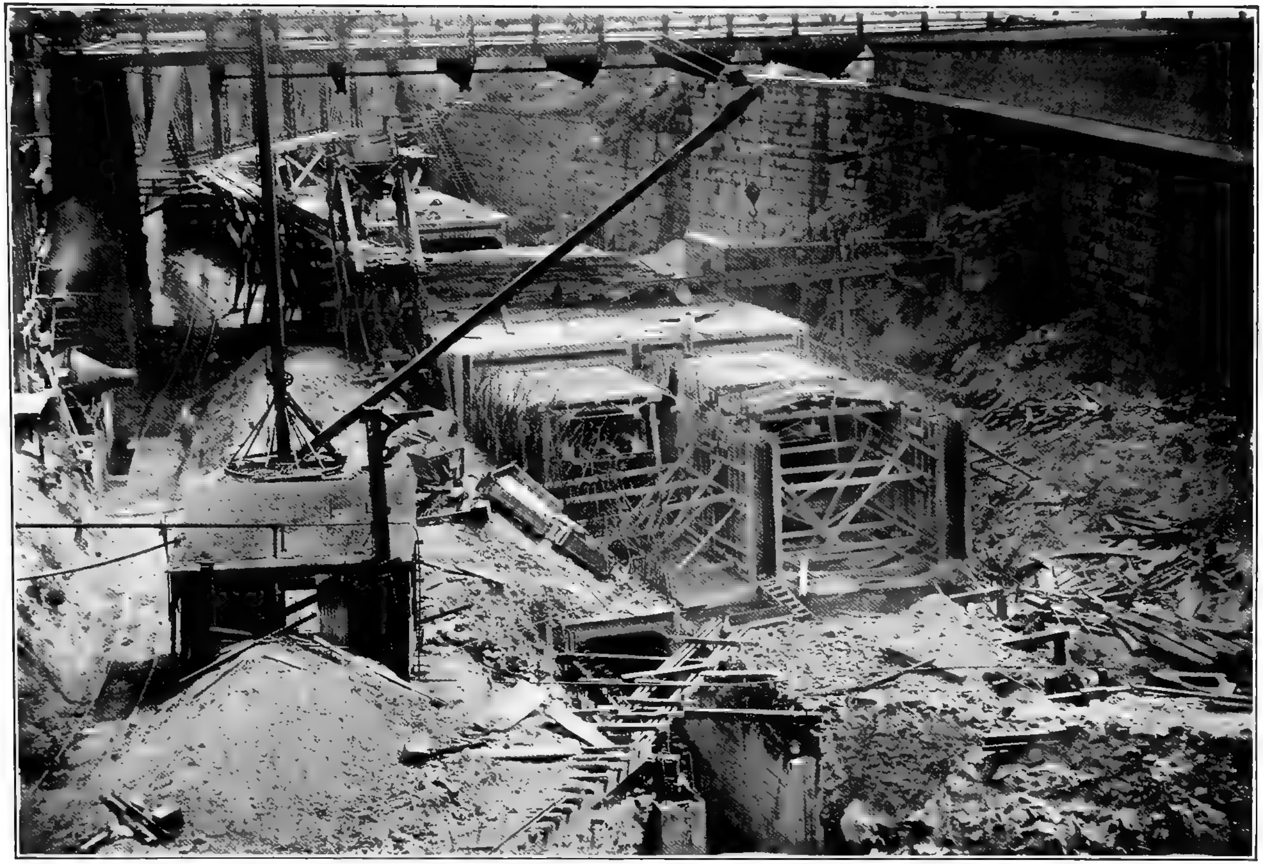
JONES' FALLS CONDUITS, SECTION No. 2.

Looking South From the Entrance of the Guilford Avenue Diversion Tunnel, Showing End of Completed Section of the West Conduit, and Piers for Foundations of the Fallsway Viaduct.



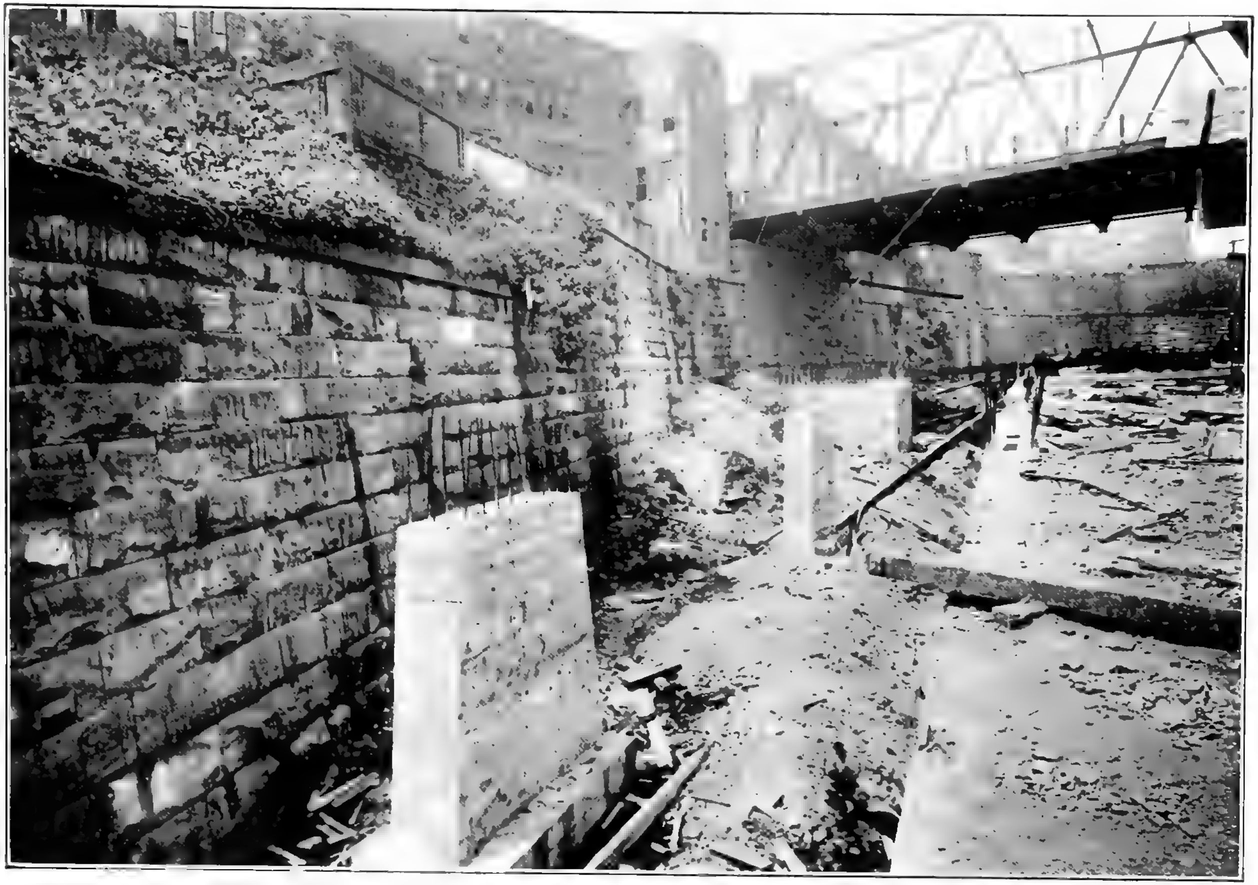
JONES' FALLS CONDUITS, SECTION No. 2.

View Looking South Towards Biddle Street. The East Conduit Has Been Completed and Work Is in Progress on the Center and West Conduits. The Track in the Foreground Is the Contractor's Tipple for Unloading Material Excavated From the Southerly End of the Guilford Avenue Tunnel. The Two Bridges Shown Will Be Eliminated When the Conduits and the Viaduct Are Completed.



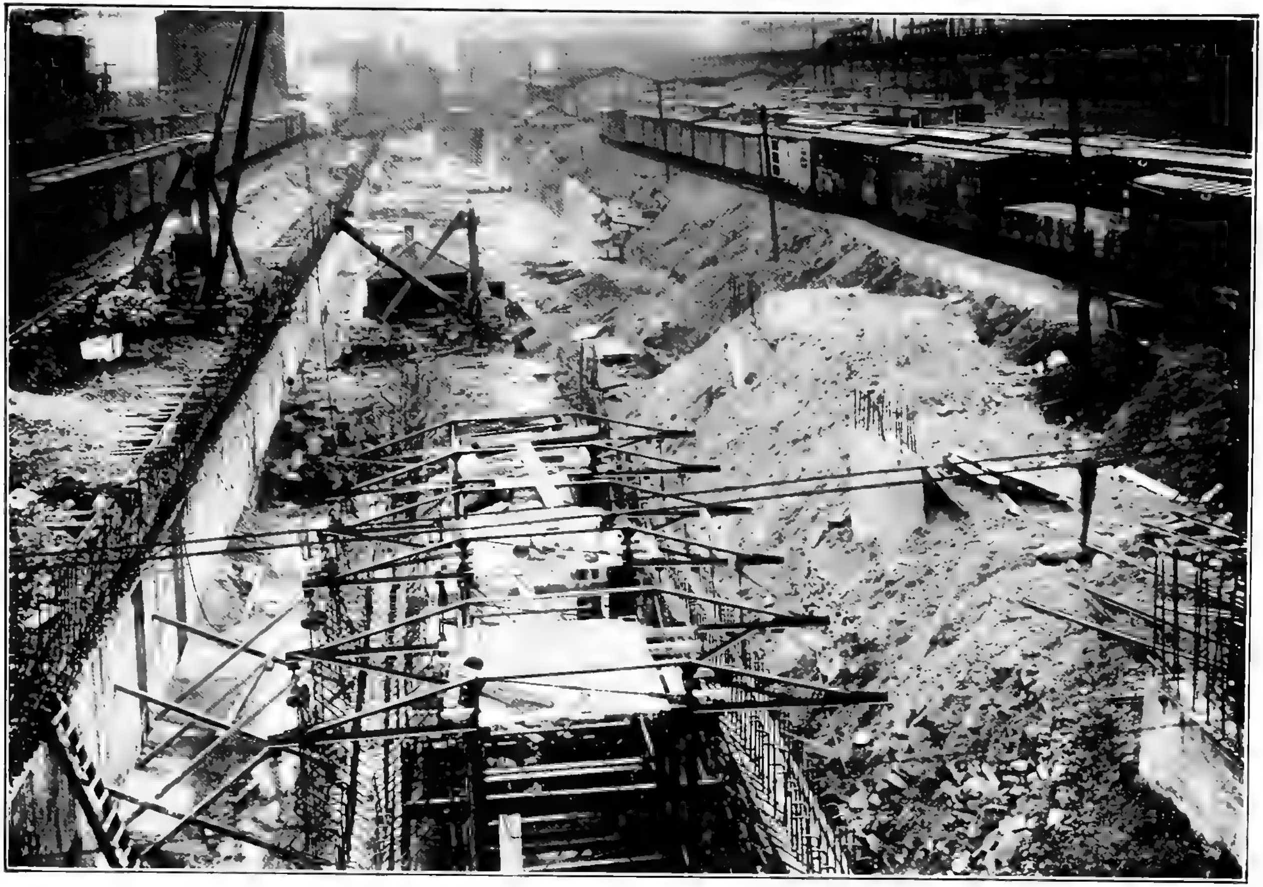
JONES' FALLS CONDUITS, SECTION No. 2.

Looking South From Biddle Street Bridge, Showing Work in Progress. The Dry-Weather Flow of the Stream Is Carried by the East Conduit.



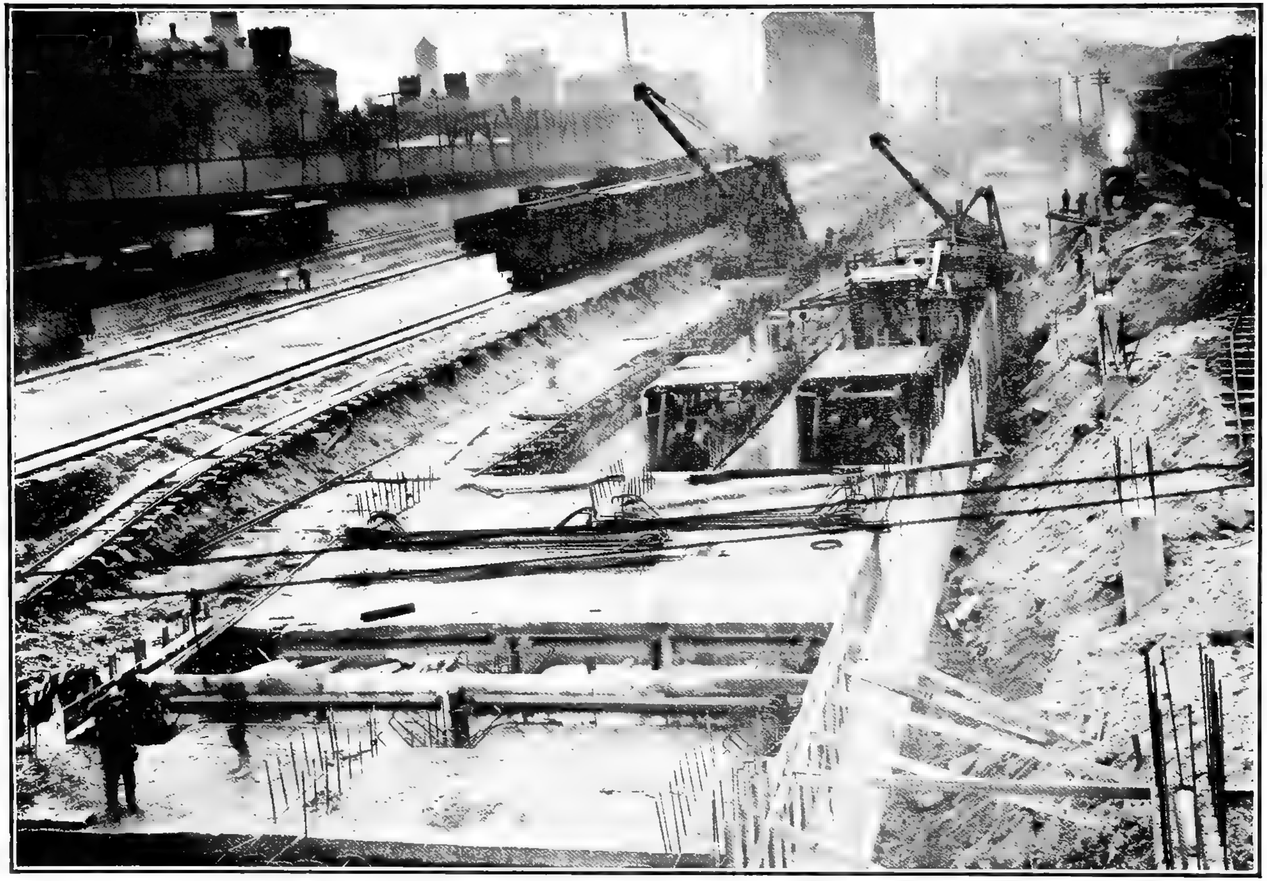
JONES' FALLS CONDUITS, SECTION No. 2.

Looking North Towards Chase Street Bridge, Showing Piers for Fallsway Viaduct. The Top of the Completed West Conduit Is Shown at the Right.



JONES' FALLS CONDUITS, SECTION No. 2.

Looking South From Eager Street Bridge. The West Wall of the Completed East Conduit Appears on the Left. The Inverts and Side Walls of the Center and West Conduits Have Been Completed. The Travellers Used for Erecting the Steel Side-Wall Forms Are in Position in the West Conduit, Preparatory to Removing the Forms.



JONES' FALLS CONDUITS, SECTION No. 2.

Looking South From Eager Street, Showing the East Conduit Completed, and the Center and West Conduits Under Construction. Two Sections of the Steel Forms for the Conduit Roof Are in Position; Also the Travellers Used for Handling the Side-Wall Forms. The Piers on the Right of the Photograph Are for the Foundations of the Fallsway Viaduct.

shortening the construction about 700 feet and giving a large quantity of excellent rock from the tunnel for the concrete necessary in the construction, which factor secured a much lower bid from the contractor, and effected a saving to the City of approximately $150,000.

The tunnel is 75 per cent. completed—the excavation at the southerly end being within 110 average feet of the the retaining wall of the Falls, between Biddle and Chase streets; the northerly end being within 97 average feet of the retaining wall in front of Union Station, and the concrete lining having been completed for a distance of 574 feet.

The difficulties the contractor has encountered in this construction have been many, and I regret to say that the sub-contractor, Lane Brothers Company, is one of the few contractors we have had to fail on us during the expenditure of some seventeen million dollars, involving many difficult pieces of construction. The original contractors, Fisher & Carozza, however, took over the work promptly and are pushing it in a much better manner that the sub-contractor was doing.

I am pleased to say, further, that for the past year we have been carrying the flow of Jones' Falls through the east conduit, which was built for the ordinary flow, and although this conduit is the smallest of the three, on account of the smooth bore and calculated grades it has been able to take care of practically all the heavy storms we have had, which verifies our calculations in a most satisfactory manner.

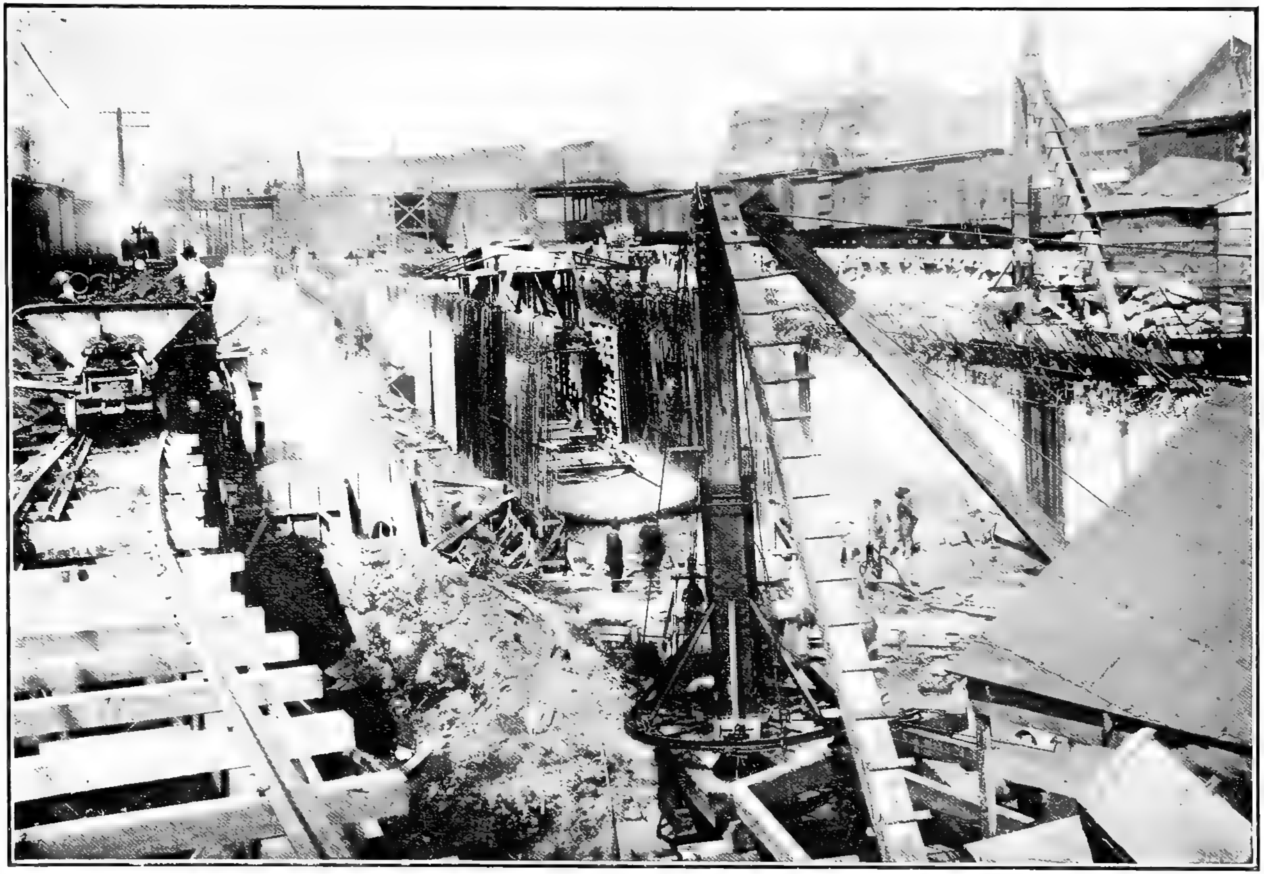
PUMPING STATION.

It is a pleasure to report that the three 27,500,000-gallon pumps, which were put into operation on January 31, 1912, have worked in a most perfect manner since that time, and have been one of the means of relieving the odor from the harbor until we were able to intercept a sufficient amount of sewage to give permanent relief. This was done by intercepting a large portion of the flow of Jones' Falls and pumping in to the Disposal Plant, there purifying it. On account of the rapid introduction of the sewerage system around the harbor, allowing us to intercept the sewage flowing into the harbor, we were able to discontinue the pumping of water from Jones' Falls on May 30, 1913. A sufficient number of houses in the low-level district have been connected to require the employment of three shifts at the Pumping Station, keeping the force at work day and night.

DISPOSAL PLANT.

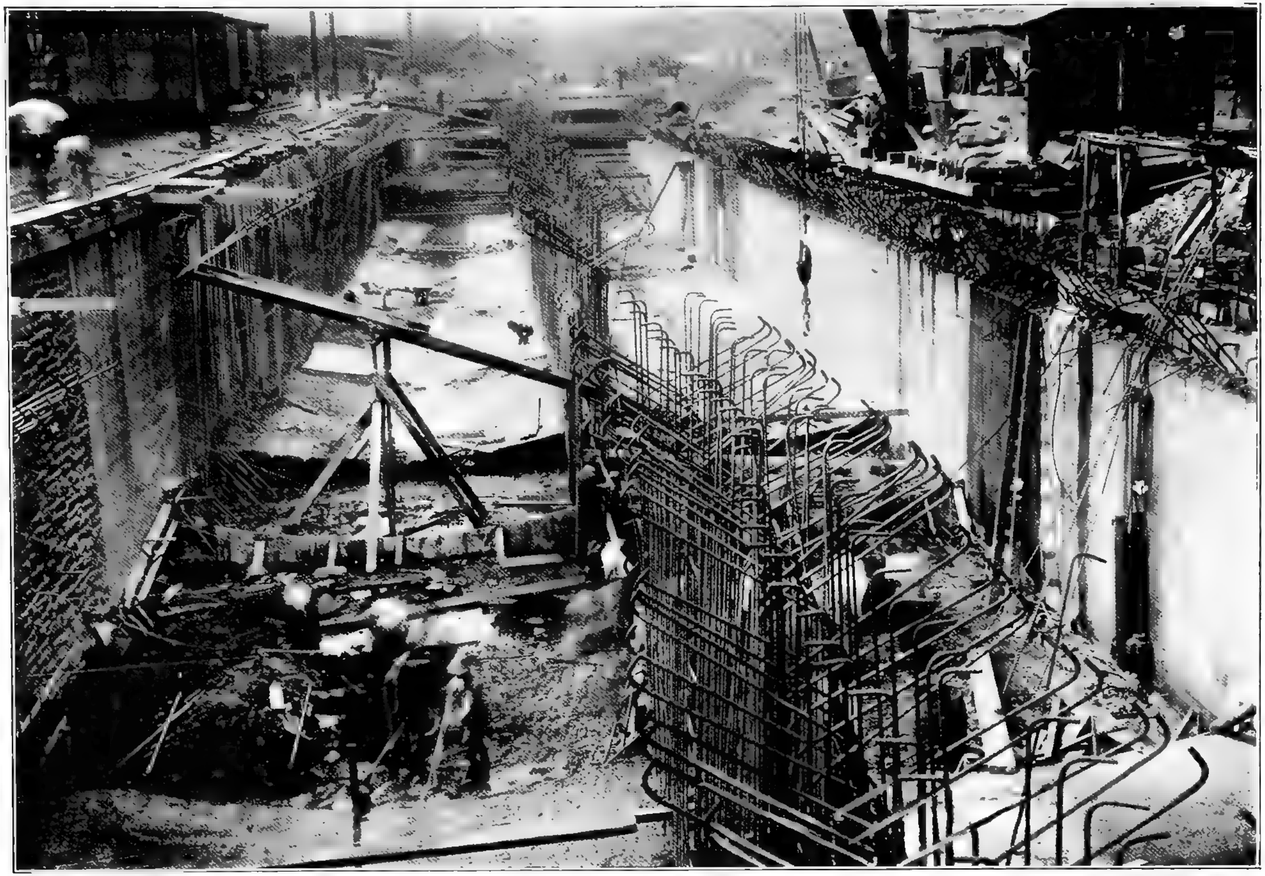
At the time of starting the construction of the sewerage system we found available $10,000,000 in bonds, being half of the amount necessary, according to our estimate. Not knowing whether sufficient funds to complete the entire system would become available later on, I endeavored to lay out the expenditure of this money in such a way, by building a certain amount of sewers in the City with a sufficiently large Disposal Plant at Back River, as to make the expenditure available as a working plant as far as the money went. This resulted in our constructing a Disposal Plant at Back River capable of taking care of 275,000 people. Immediately on the voting of the additional funds to complete the system (which loan, I am informed, passed by the largest vote ever received in the City of Baltimore), plans were made to bring the Disposal Plant up to a capacity of 600,000 people. Work on this extension has progressed in a satisfactory manner during the year. In the extension, improvements in detail have been made, and the plant is being kept up to the very latest word in sewage disposal, both in this country and abroad. The power and light secured by the flow of the sewage are giving most satisfactory results.

We have turned over to the Health Department about 40,000 houses for connection to the sewers and will have ready in a



JONES' FALLS CONDUITS, SECTION No. 2.

Looking North Towards Eager Street Bridge, Showing Work in Progress. The Material Excavated From the Bed of the Stream by the Derrick in the Foreground Was Distributed Alongside of the West Conduit by the Track and Cars Shown on the Left. The Piers in the Left Center Are for the Foundations of the Fallsway Viaduct,

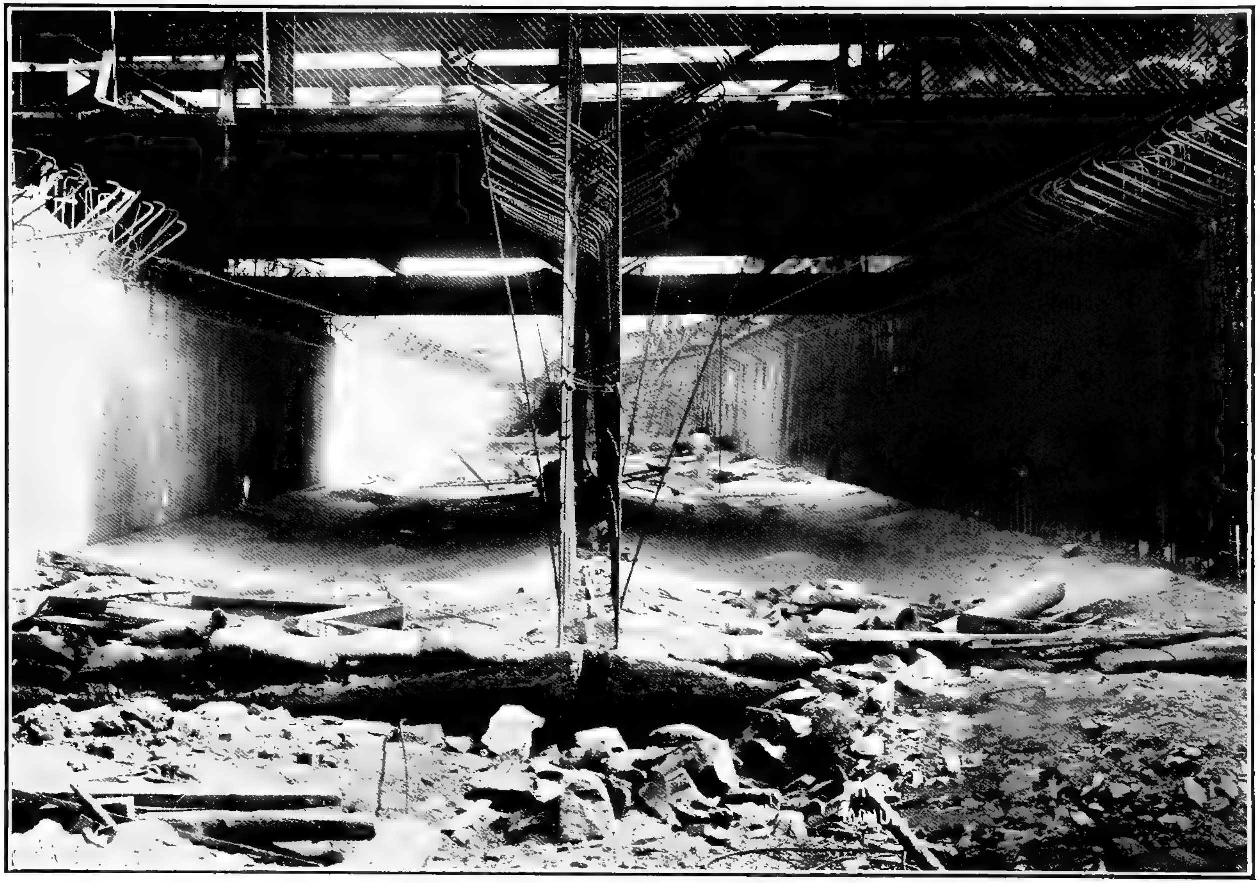


JONES' FALLS CONDUITS, SECTION No. 2.

Looking North From Monument Street Bridge, Showing West Wall of Completed East Conduit and Work in Progress on Center and West Conduits. The Size and Arrangement of the Wall Reinforcement Is Clearly Shown.

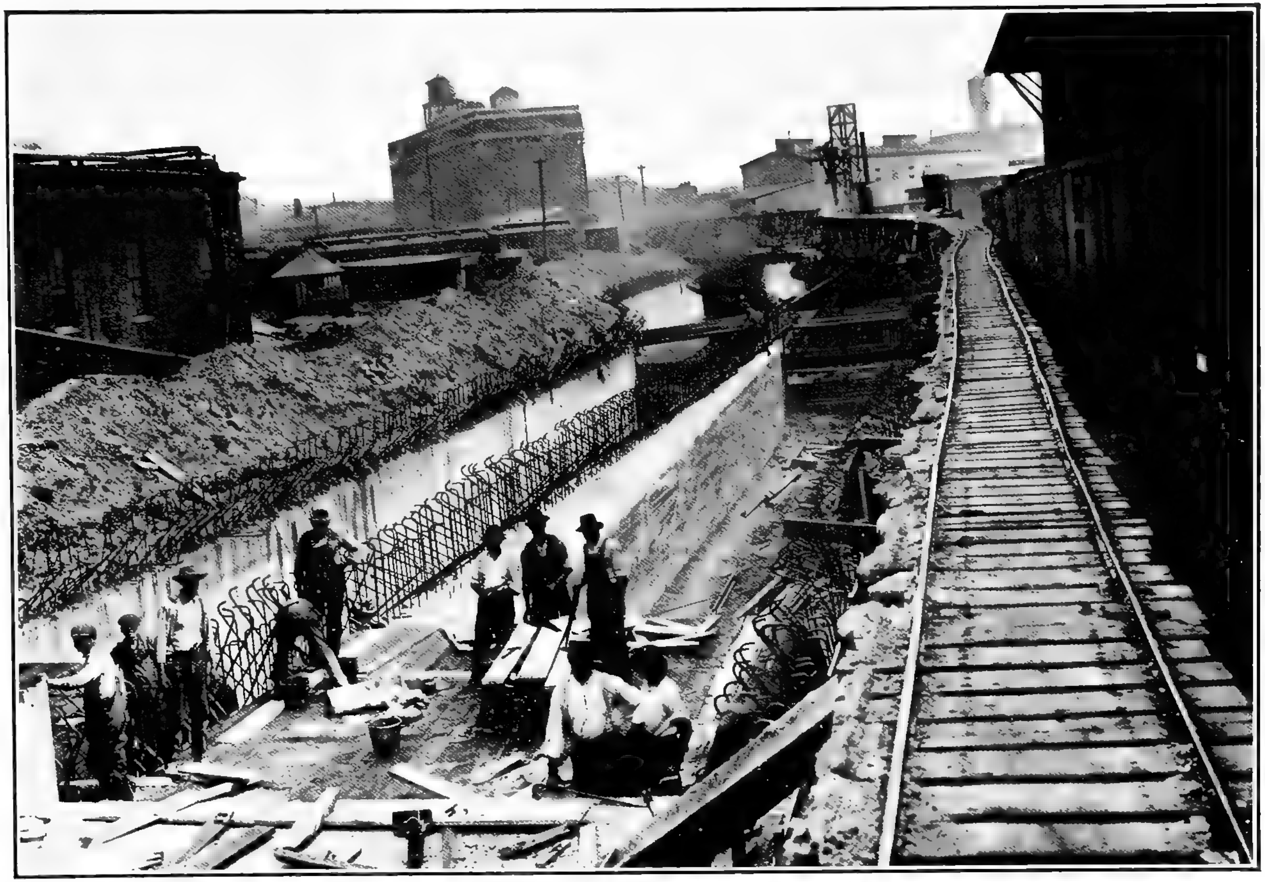
JONES' FALLS CONDUITS, SECTION No. 2.

Showing Work in Progress Under the Bridge at Monument Street. The Three Pipes Shown in the Center Are 30-Inch Cast-Iron Pipes, Which Were Built Into the Invert of the Center and West Conduits in Order to Discharge Existing Drains on the West Side of the Falls Into the East Conduit,



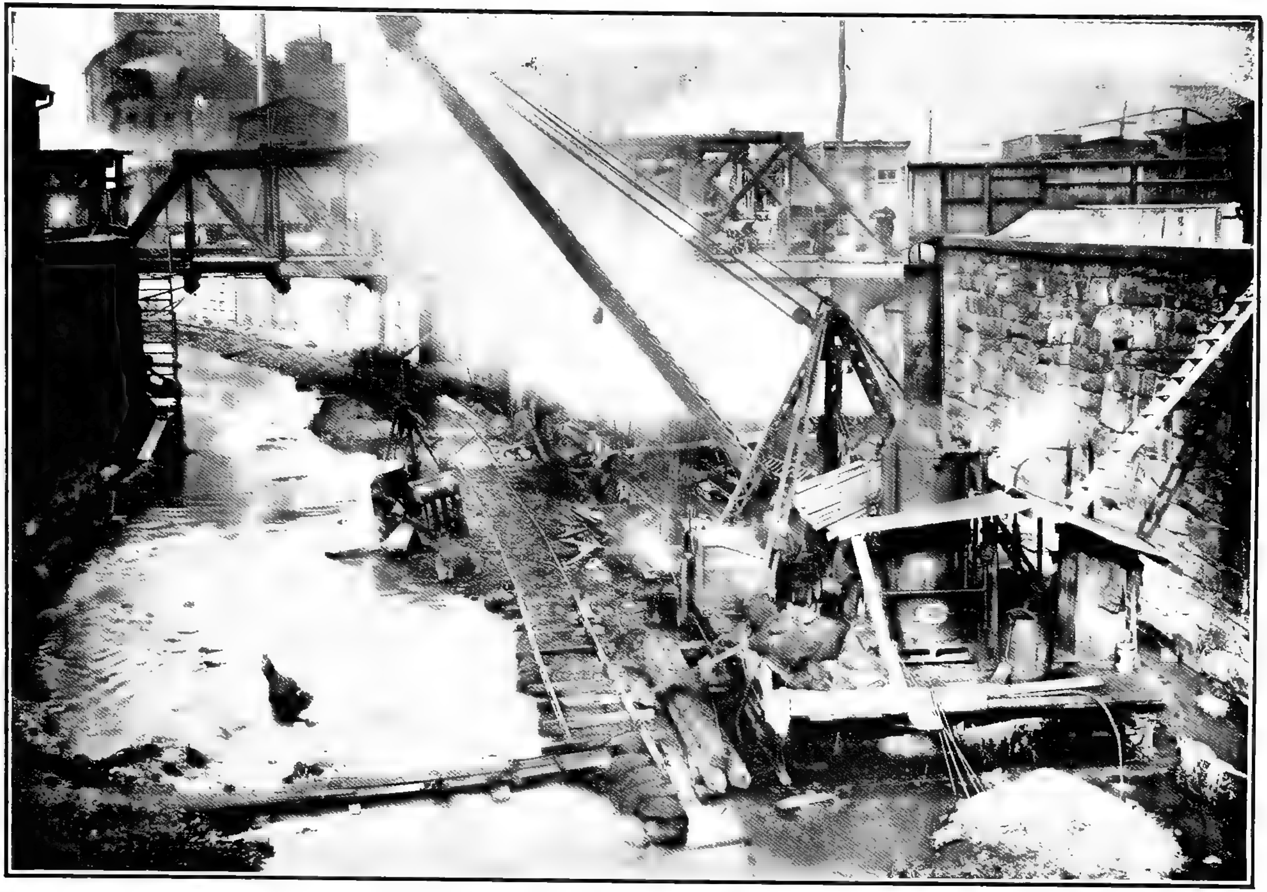
JONES' FALLS CONDUITS, SECTION No. 2.

Looking South Under Monument Street Bridge, Showing the West Wall of the Completed East Conduit, and the Side-Wall Reinforcing and Completed Inverts of the Center and West Conduits.

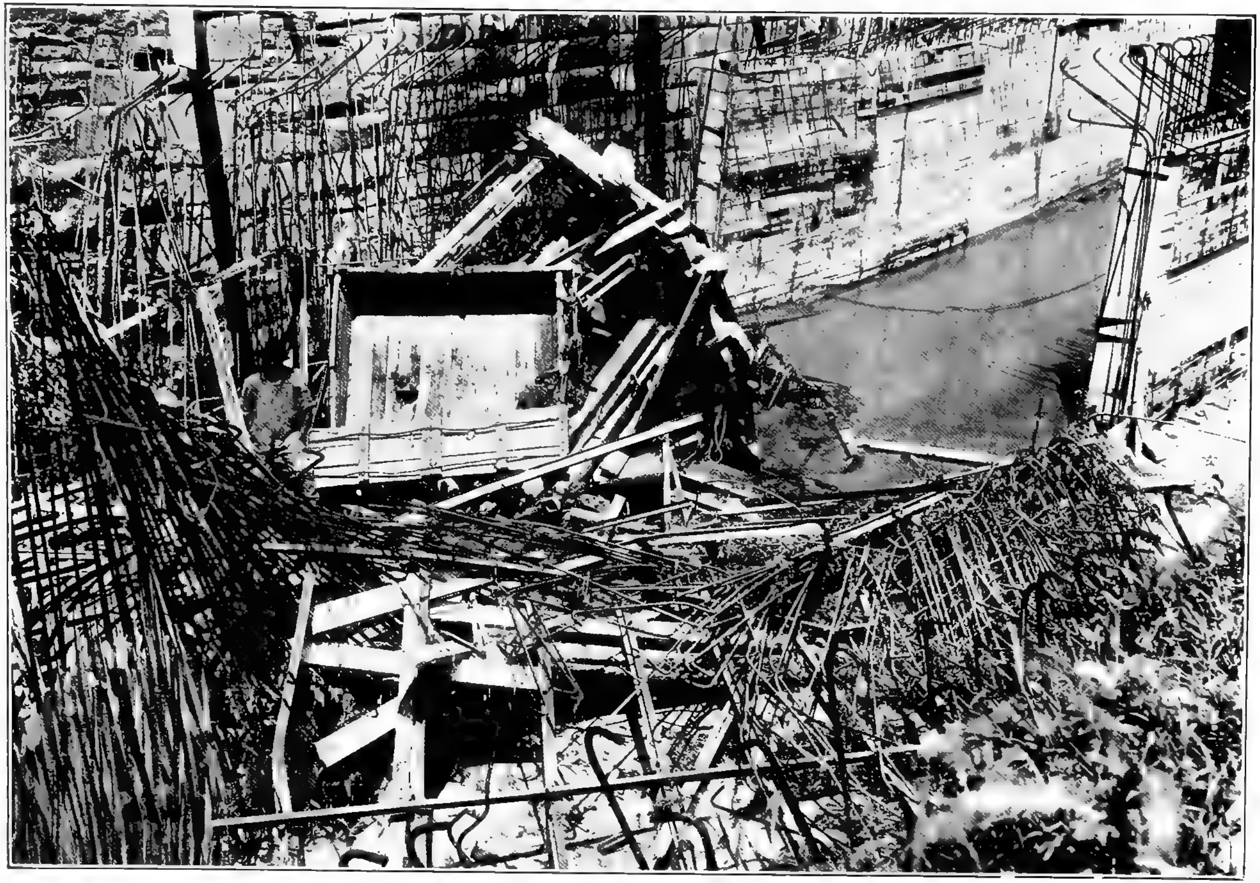


JONES' FALLS CONDUITS, SECTION No. 2.

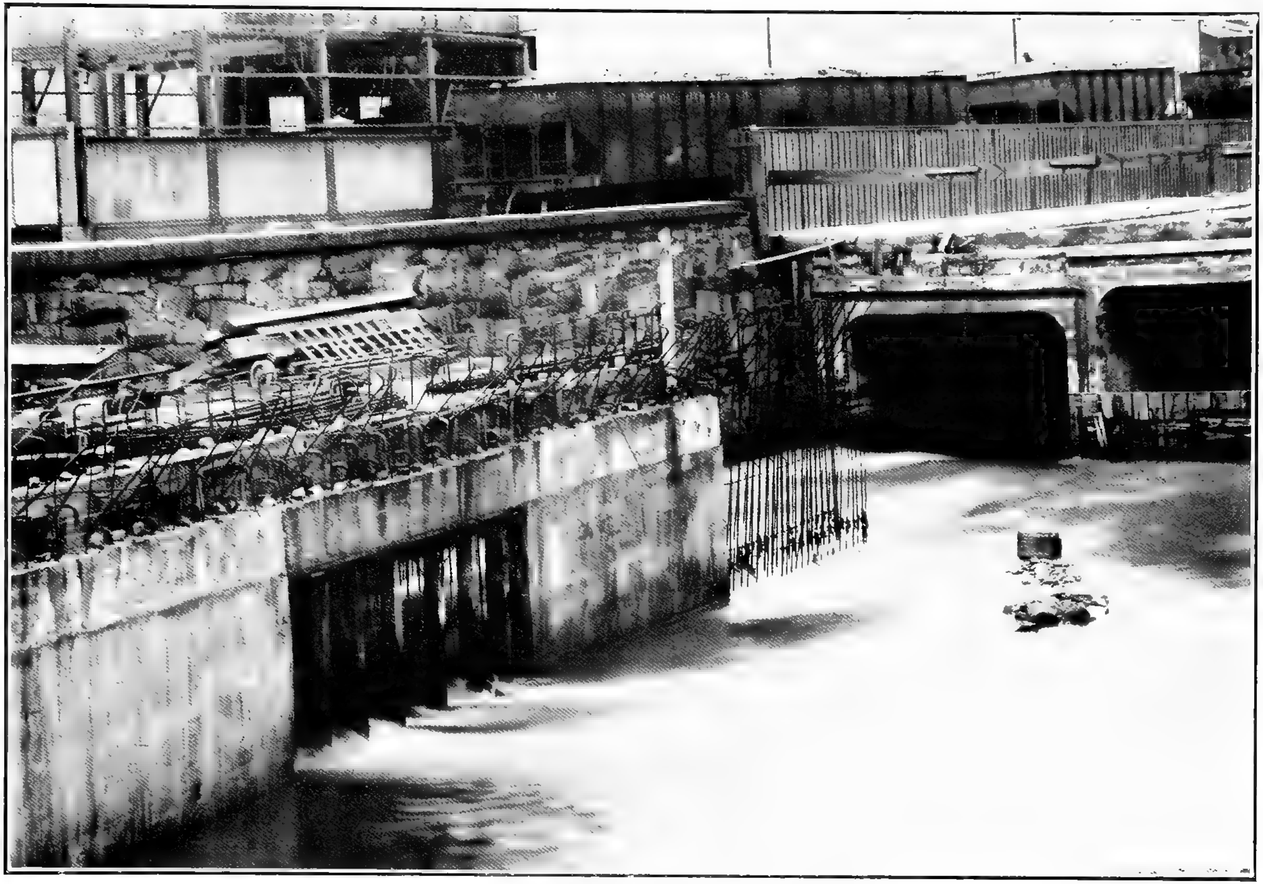
Looking South From Monument Street Bridge, Showing Work in Progress on Center and West Conduits. The Track on the Right Was Used for Distributing Concrete From the Mixing Plant at Centre Street. The Flow of the Stream Has Been Diverted Into the Completed East Conduit, Which Is Covered by the Pile of Earth at the Left.



JONES' FALLS CONDUITS, SECTION No. 2.
Looking North From the End of Section No. 1, Showing Derrick and Clam-Shell Bucket Used for Excavation.

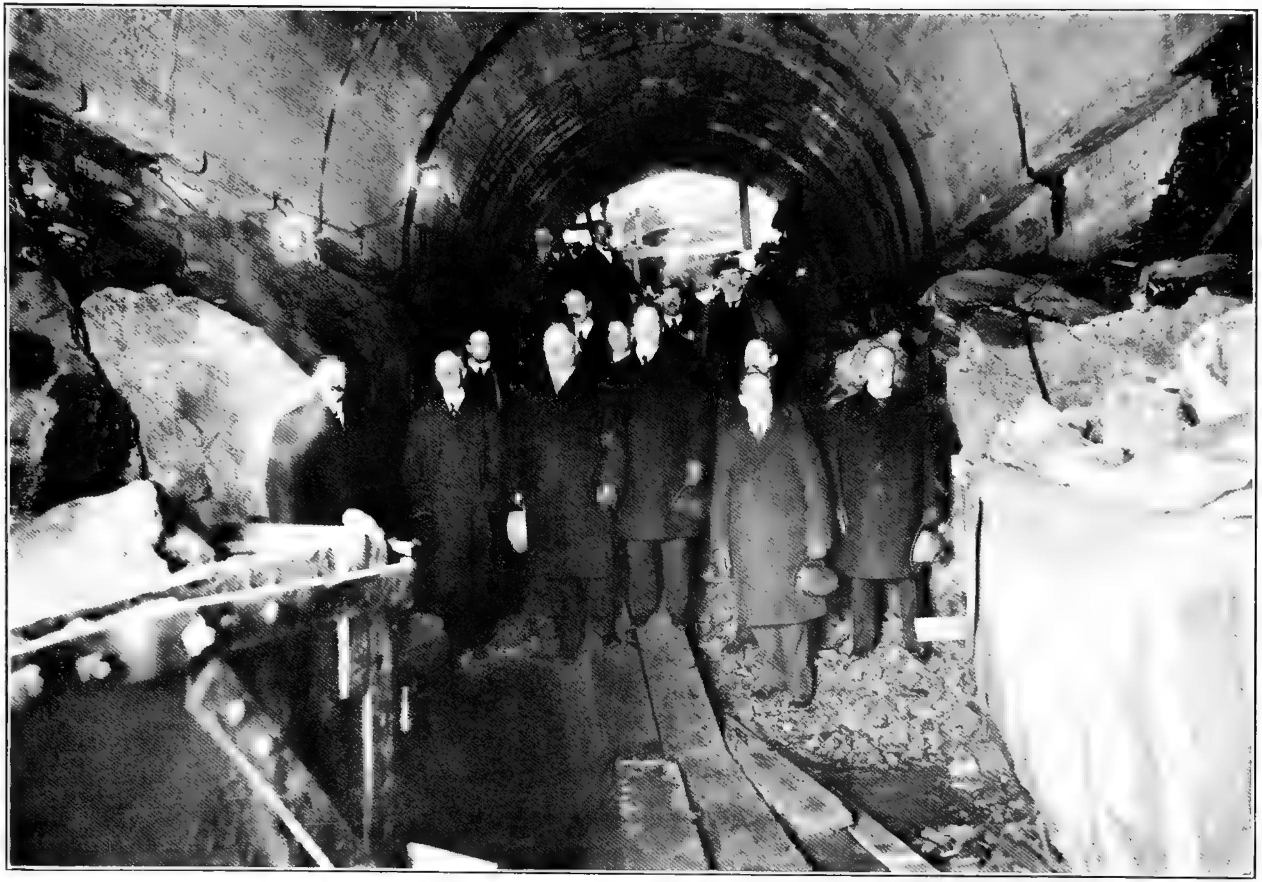


JONES' FALLS CONDUITS, SECTION No. 2.
Looking North From the Northerly End of Section No. 1, Showing Wreckage Resulting From High-Water, August 2, 1913.

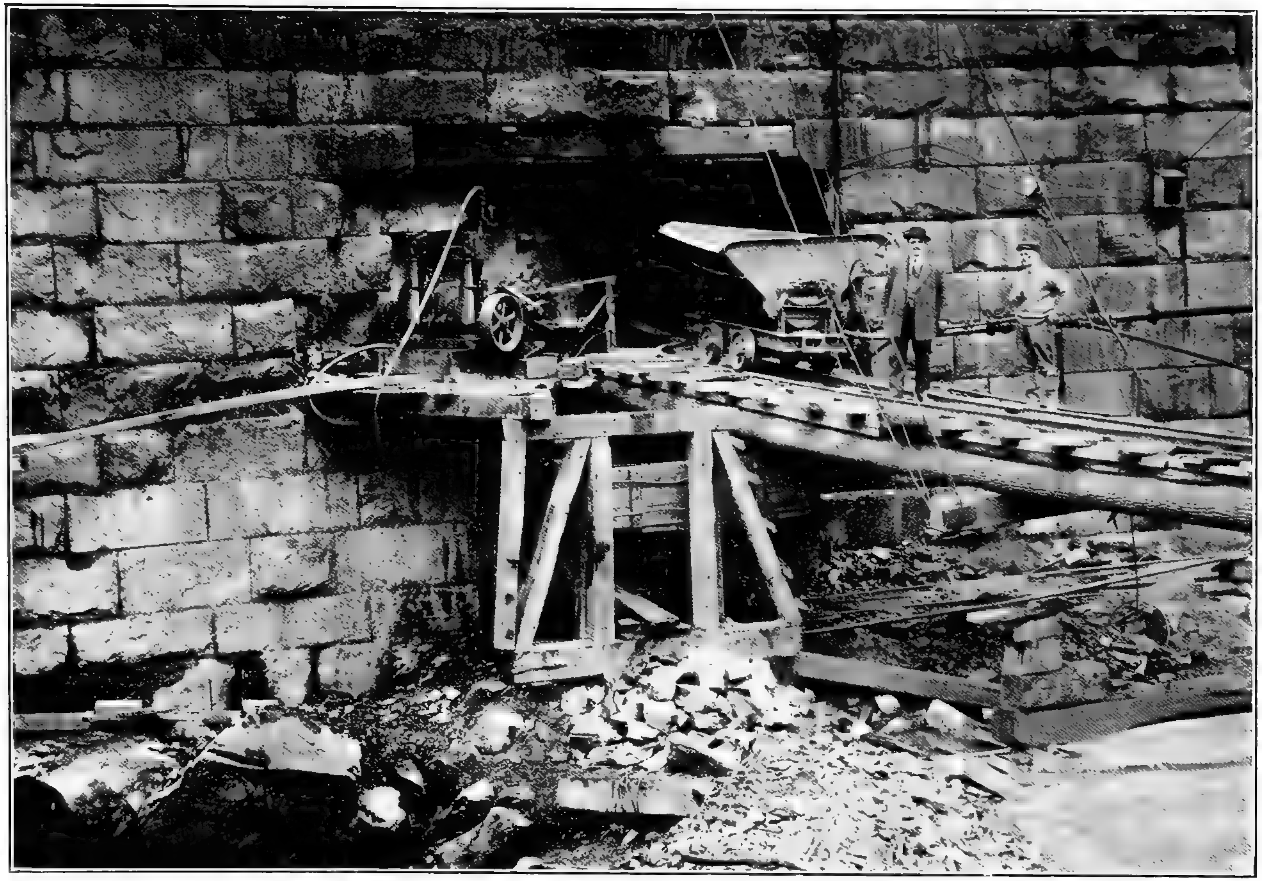


JONES' FALLS CONDUITS, SECTION No. 2.

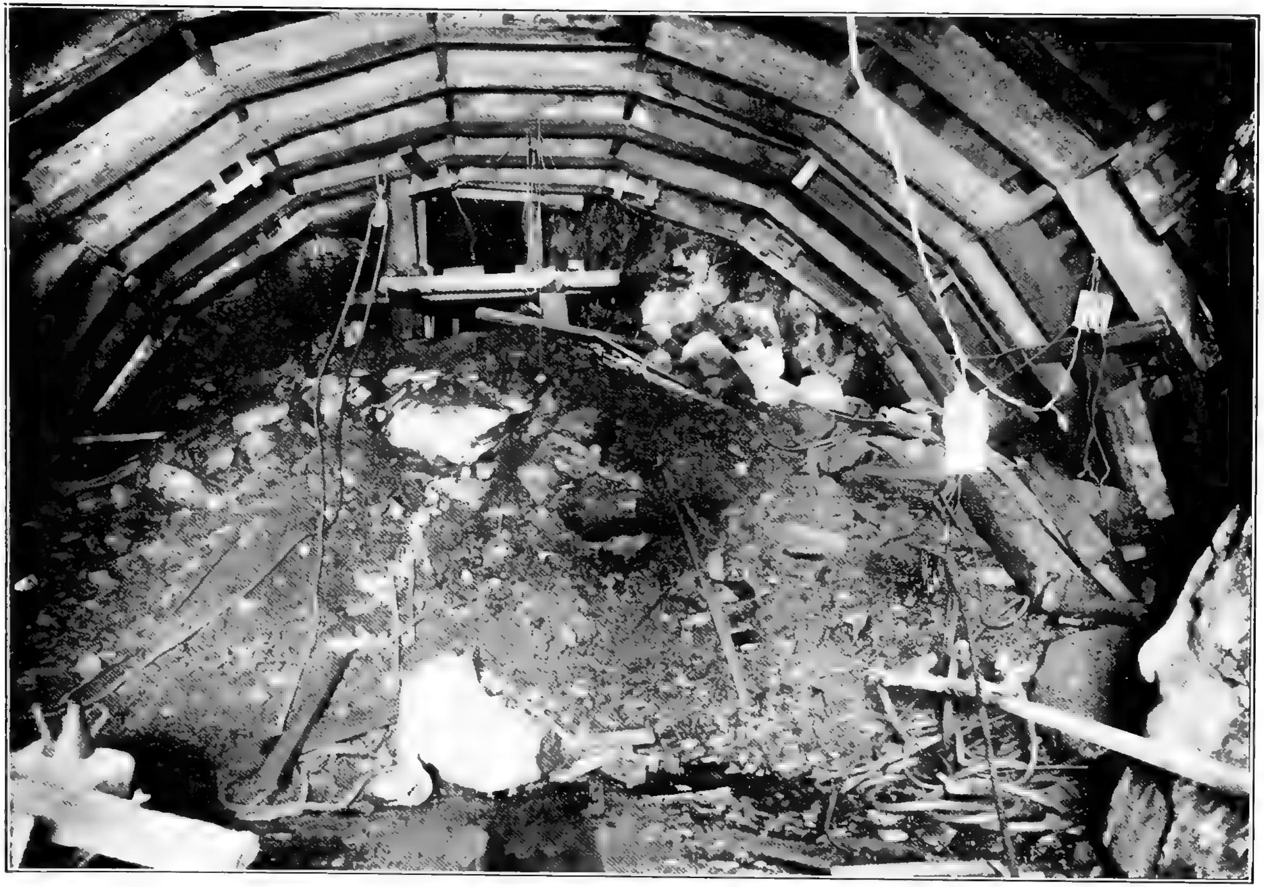
Looking South From Centre Street Bridge During High-Water, Showing the Entire Flow of Jones' Falls Entering the Upper End of the East Conduit, Section No. 1.



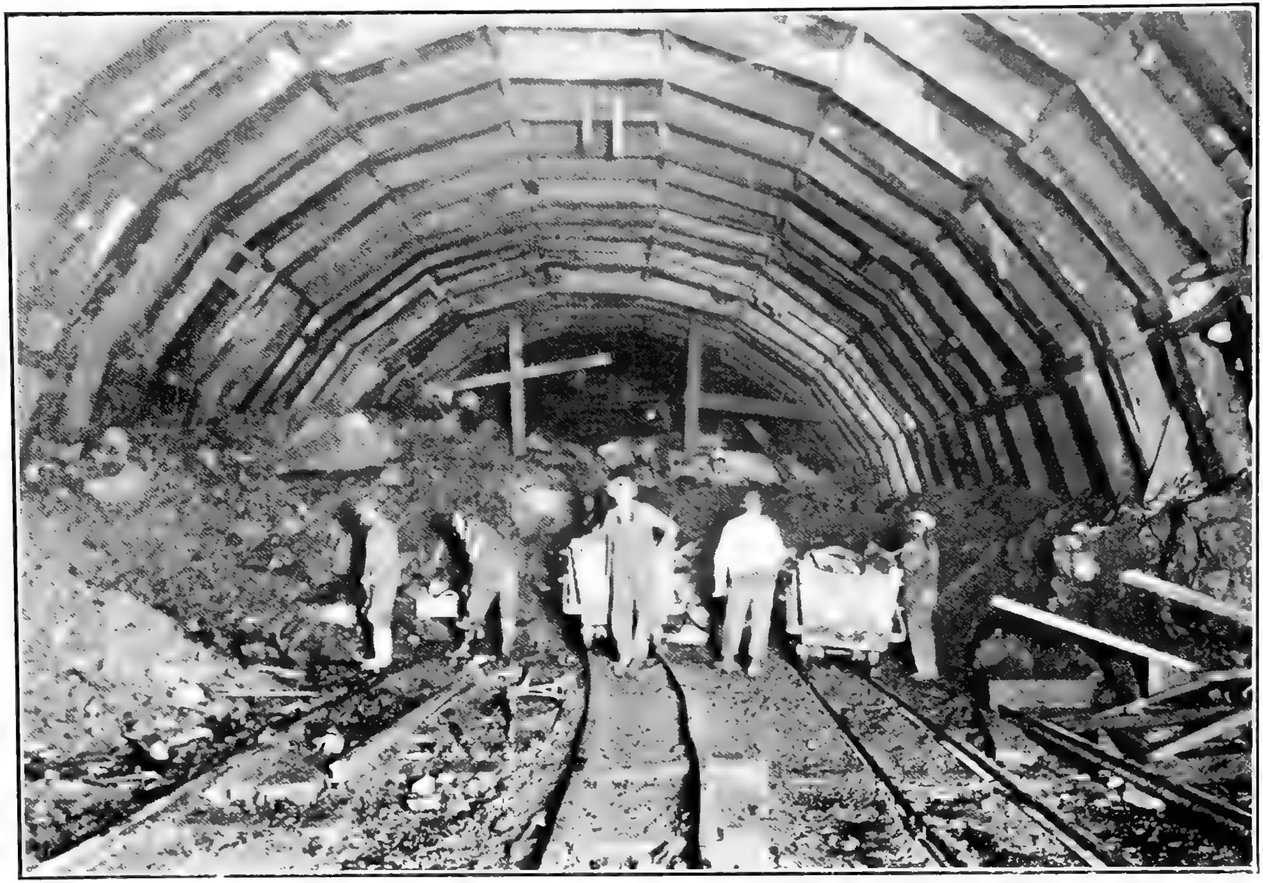
JONES' FALLS CONDUITS, SECTION No. 2.
Guilford Avenue Diversion Tunnel.
Showing Concrete Lining of Arch Completed.



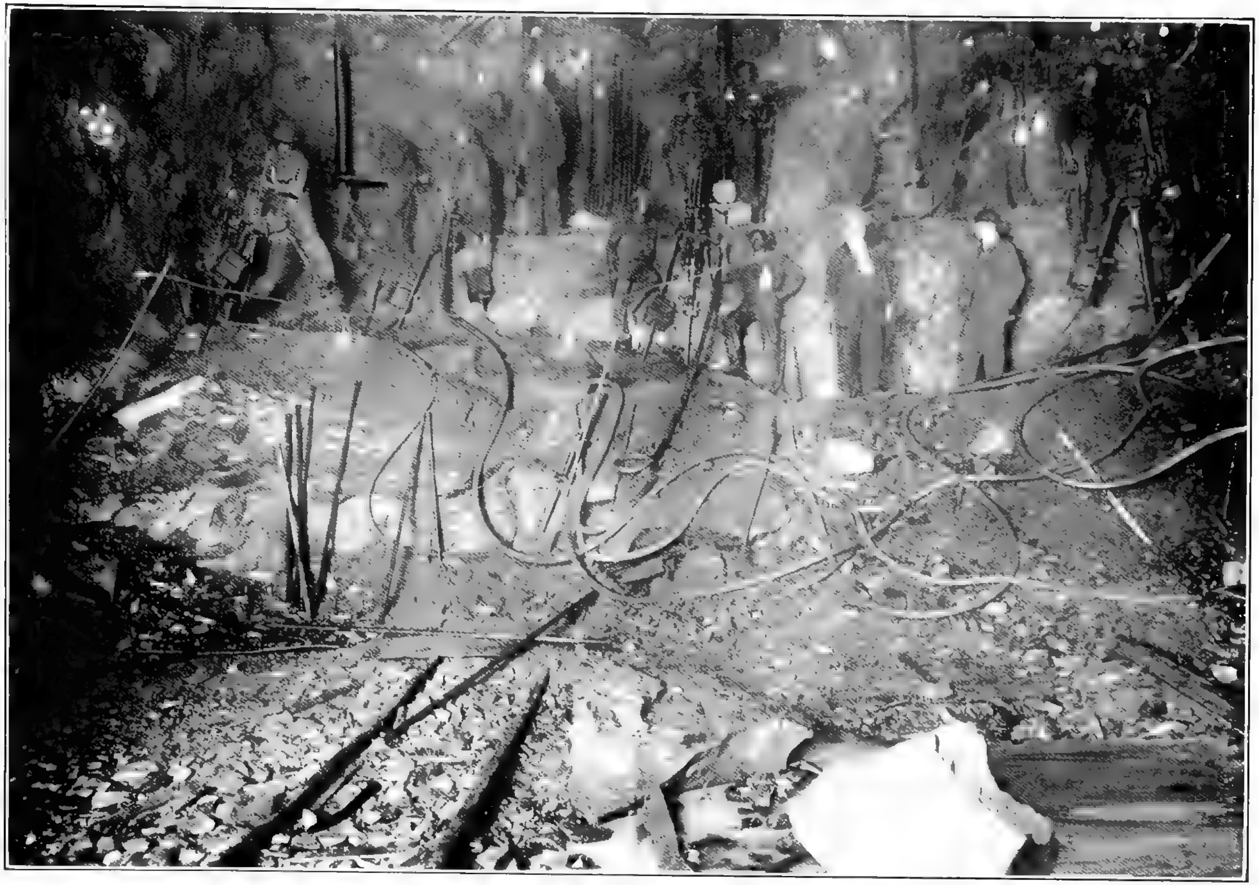
JONES' FALLS CONDUITS, SECTION No. 2.
Guilford Avenue Diversion Tunnel.
South Entrance of Heading.



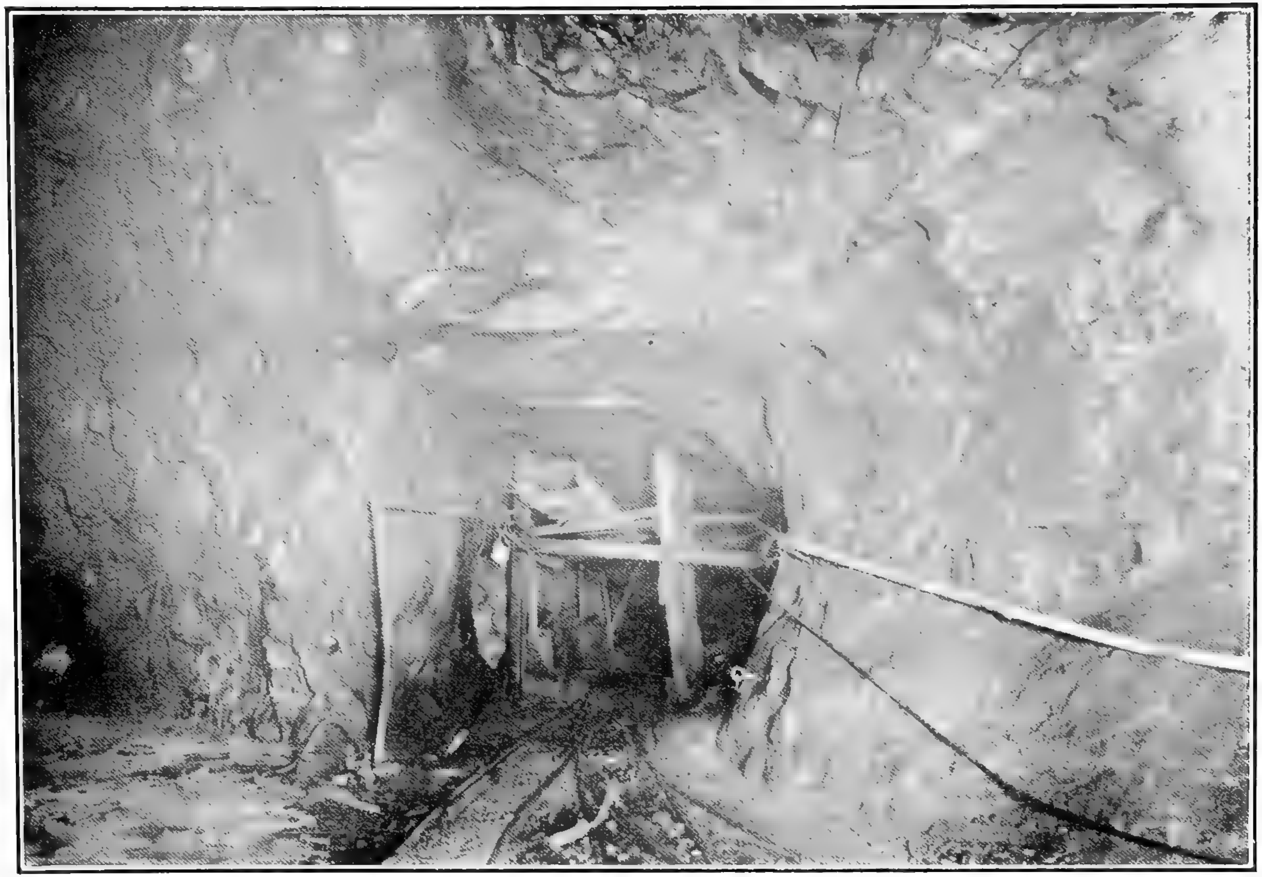
JONES' FALLS CONDUITS, SECTION No. 2.
Guilford Avenue Diversion Tunnel.
Showing 12-Inch by 12-Inch Segmental Lining, Which Was Used Where the Roof Was of Earth or of Soft, Seamy Rock.



JONES' FALLS CONDUITS, SECTION No. 2.
Guilford Avenue Diversion Tunnel.
Showing Timbering in Earth and Dump Cars Used for Removing Excavated Material.



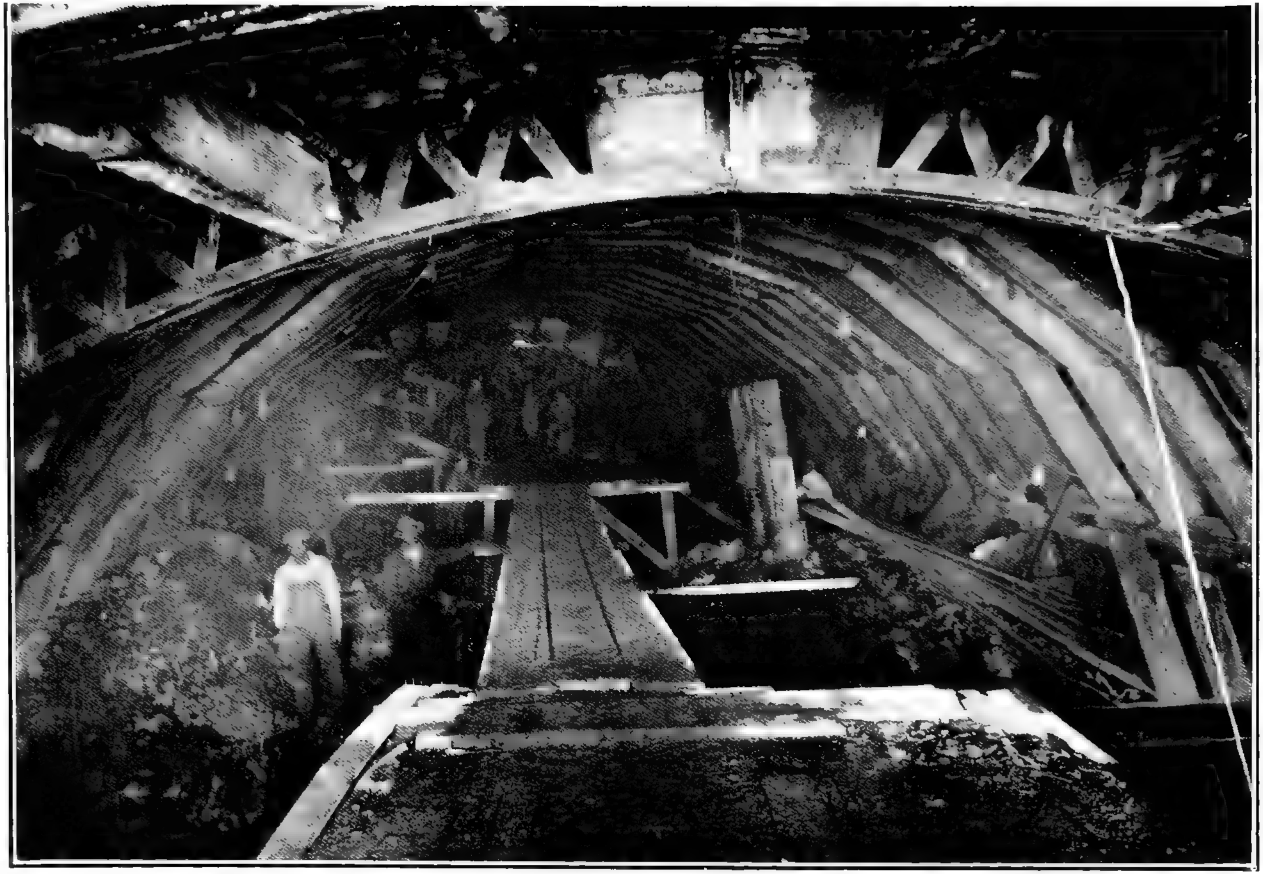
JONES' FALLS CONDUITS, SECTION No. 2.
Heading of the Guilford Avenue Diversion Tunnel.



JONES' FALLS CONDUITS, SECTION No. 2.

Guilford Avenue Diversion Tunnel.

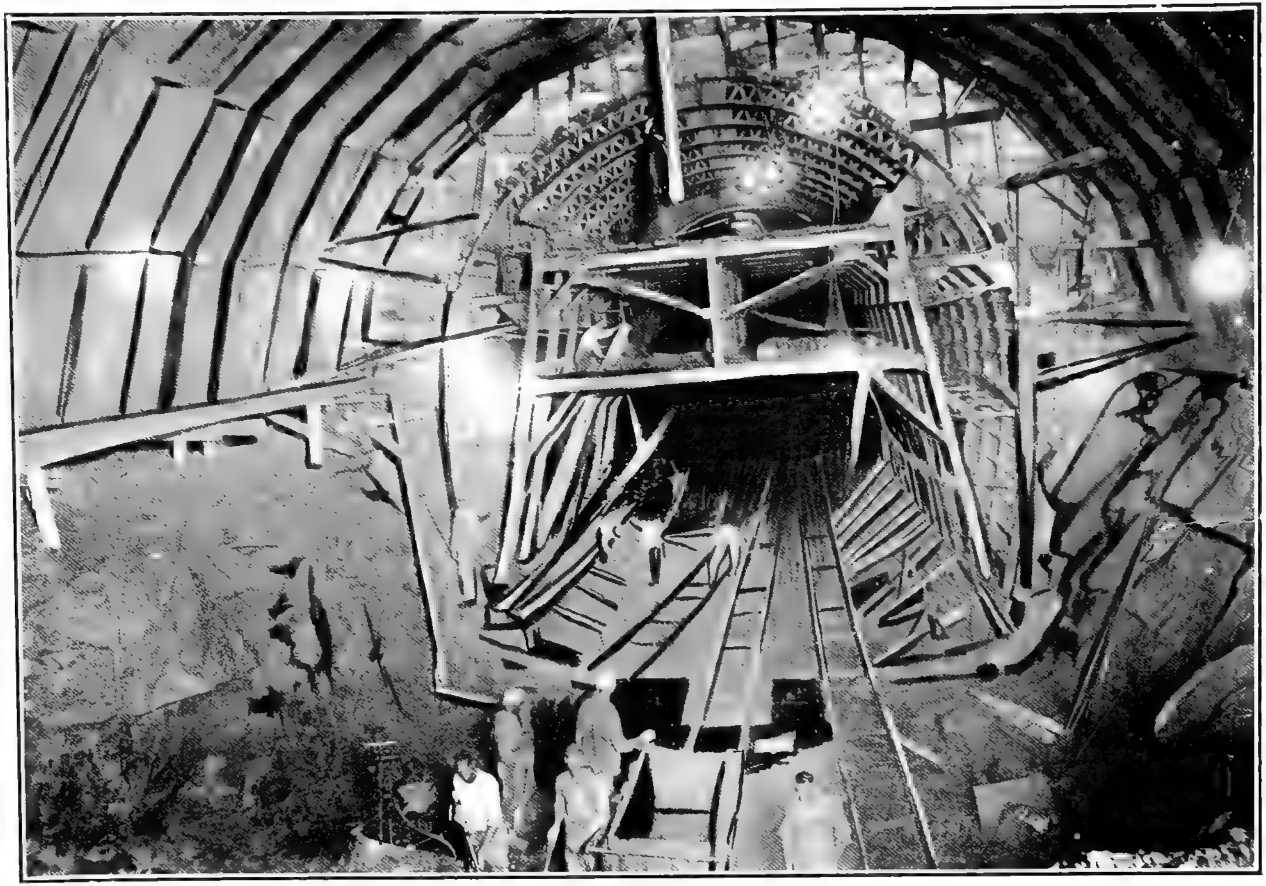
Showing Junction of Tunnel for Jenkins' Run Sewer With Main Tunnel. The Branch Tunnel Was Used as an Outlet for the Material Excavated From the Main Tunnel.



JONES' FALLS CONDUITS, SECTION No. 2.

Guilford Avenue Diversion Tunnel.

Showing Steel Centering of Forms for the Concrete Lining of the Arch. The Latticed Steel Ribs Extended From Invert to Invert, and the Forms From the Invert to the Springing Line Were of Steel. From the Springing Line to the Top of the Arch, 3-Inch Lagging Was Laid on the Ribs, and Was Carried Up as the Concrete Was Placed. The Segmental Timbering Used in Soft Ground Is Shown in the Background.



JONES' FALLS CONDUITS, SECTION No. 2.
Guilford Avenue Diversion Tunnel.
Showing Steel Forms for Concrete Lining and Segmental Timbering in Soft Ground Section.

short time about 20,000 more. I understand that over 30,000 houses have been connected and are now draining to the Disposal Plant.

HYDRO-ELECTRIC PLANT.

In designing the Disposal Plant, arrangements were made to insert turbines at the point where the purified sewage was ready to be discharged into Back River. The flow of the purified sewage operates these turbines, which in turn run dynamos, producing more than sufficient power and light to operate the plant—a feature that stands out unique in sewage disposal, Baltimore being the only place where such power is secured.

FALLSWAY VIADUCT.

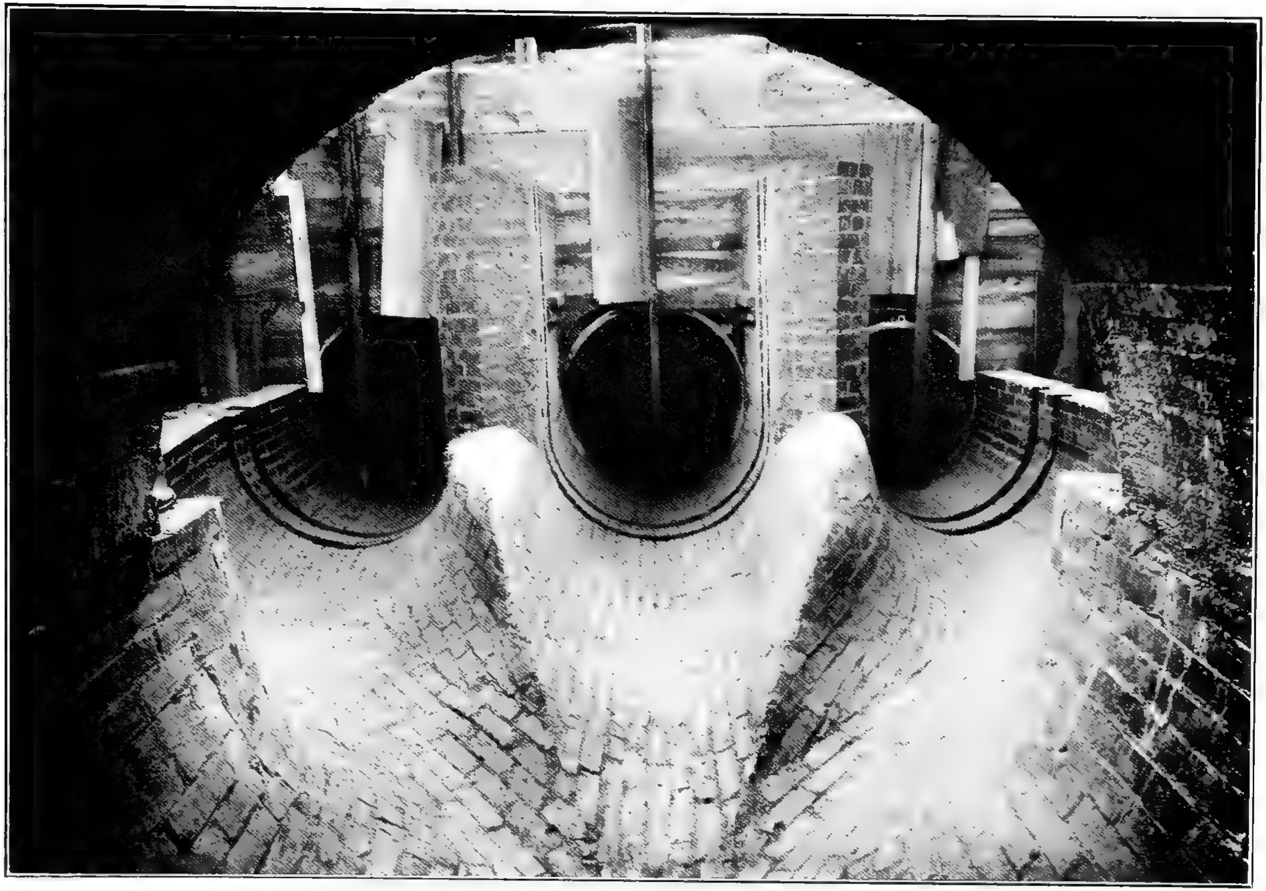
In accordance with the action of the Mayor and the Board of Estimates, employing me as Consulting Engineer to carry out the construction of the Viaduct, which action was approved by your Commission, I proceeded and designed the Viaduct along the general lines recommended in my report to the Commission in 1906.

This Viaduct is for the purpose of lifting the road-bed of the Fallsway, constructed over the top of the Jones' Falls reinforced conduits, from the present crossing of Madison street at the intersection of the Falls, to the present grade of Eager street, Chase street and Guilford avenue, crossing the Northern Central tracks above grade.

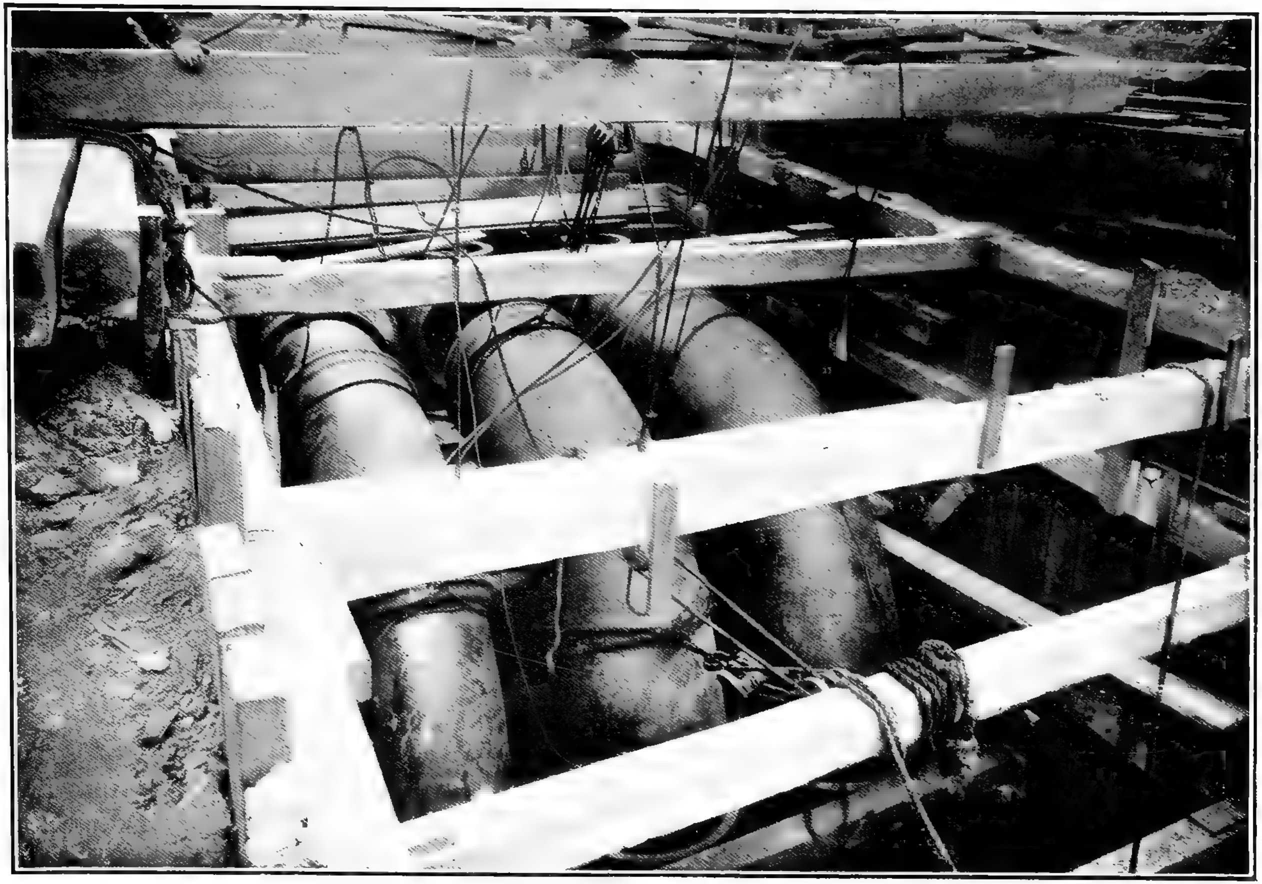
This contract was awarded to Stewart-Jones Company and Claiborne, Johnston & Company, at their bid of $190,693.15. Later, through the sanction of the City Solicitor, the bonding companies and the Board of Estimates, the Stewart-Jones Company dropped out, leaving the work in the hands of Claiborne, Johnston & Company.

This contract covered the superstructure, over the roof of the conduits, as the foundations had been previously authorized by the Board of Estimates, after arranging with your Commission to construct them in conjunction with the building of the conduits in the bed of the Falls, it being more economical to build the foundations for the Viaduct into the roof of the conduits while the latter were in process of construction. These foundations were constructed at the low unit prices obtained in the conduit work, the cost amounting to about $25,000. Payment for this work is being made by the Commission on monthly estimates, to the contractor for Section No. 2 of the Jones' Falls Conduits, and upon its completion the amount expended is to be repaid to the Commission from the funds apropriated for the construction of the Fallsway.

In designing the Viaduct, the first 438 feet, from Madison street north, starting at nothing and rising to a height of 15½ feet, was of such construction as would not permit of the building of arches from an architectural standpoint. It was designed so as to have the roadway of this portion laid on a fill between retaining walls. In place of letting a contract for the filling in of this space at additional cost to the City, I recommended that this be made a central dump, charging a price per load for dumping earth, thereby receiving a revenue instead of making an expenditure. This fill is proceeding in a very satisfactory manner, and arrangements have just been made with large contractors to begin running the dirt in very rapidly. Therefore, if the weather permits, in the course of a very short time I do not see why traffic cannot be diverted over the portion of the Viaduct from Eager street south, ahead of the paving, if so desired. However, it would be better if arrangements could be made to pave this section ahead of the other paving, immediately on our releasing it, which will be in advance of the fill being completed, if the weather conditions are favorable. This would be desirable from several standpoints. In this connection, careful consideration should be given to the question of the advisibility of using bituminous joints in the paving of the Viaduct, for two reasons: First, we have expansion joints in the floor slab, which will be quite a factor in the

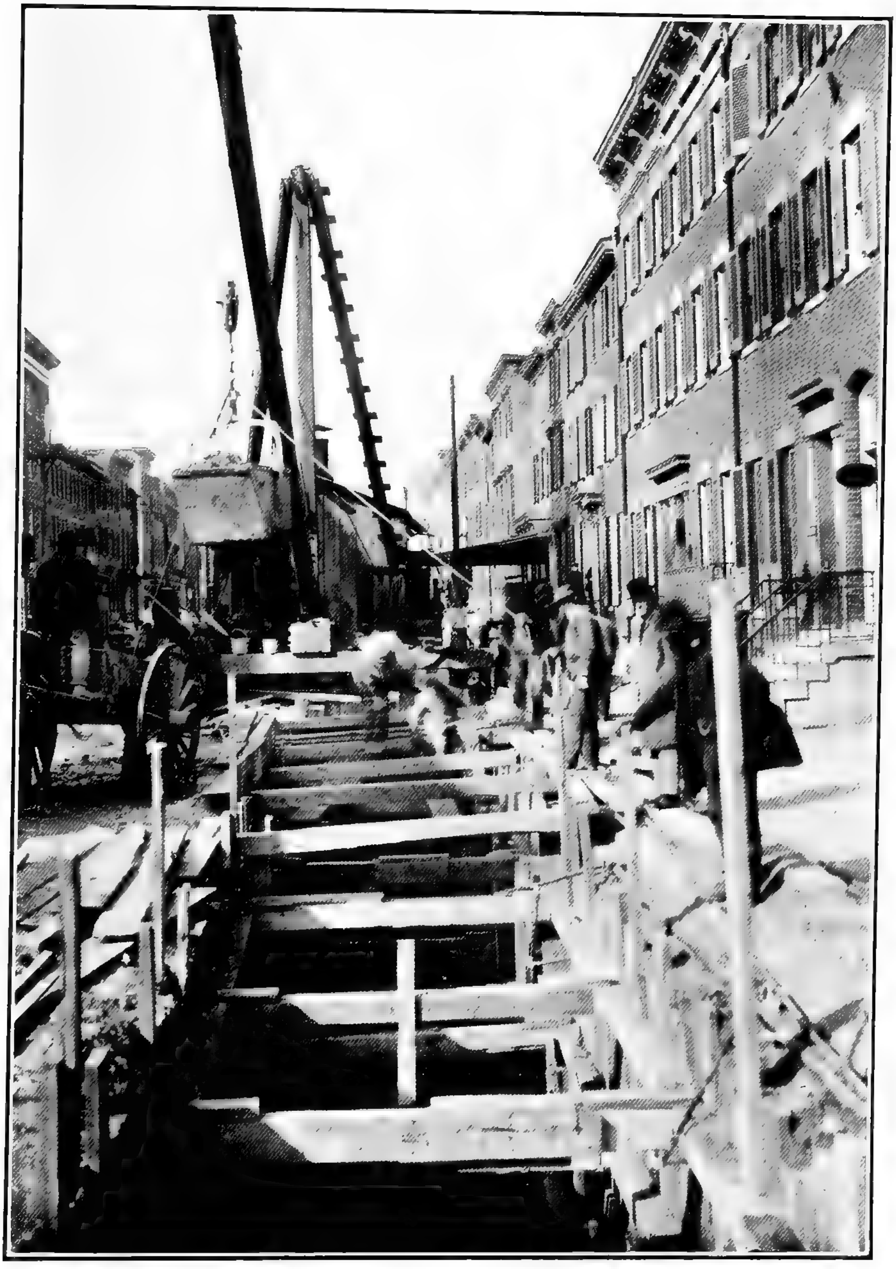


HIGH LEVEL INTERCEPTOR, SECTION No. 3.
West End of Siphon Which Carries the Interceptor Under Jones' Falls at Eager Street. This Siphon Is Composed of Three Lines of Cast-Iron Pipe, Two Being 42 Inches in Diameter and One 36 Inches. The Sewage Can Be Diverted to Any One or More of the Three Pipes, as Required, by Means of Stop Planks.



HIGH LEVEL INTERCEPTOR, SECTION No. 3.

Top of Riser Pipes at Easterly End of Siphon Which Carries the Interceptor Under Jones' Falls at Eager Street. From This Point the Pipes Run on a Rising Grade to the Discharge Chamber.



HIGH LEVEL INTERCEPTOR, SECTION No. 6.

Trench in Fayette Street, East of Carrollton Avenue. The Top of the Sewer at This Point Is Twenty Feet Below the Surface of the Ground.

future, and bituminous joints in the paving will allow the expansion and contraction to take place much better than a cement joint; second, it will reduce the noise, which is now complained of on the lower section of the Fallsway, where cement filler was used.

While the work on the Viaduct has not moved along as rapidly as desirable, the section between Madison and Eager streets has been a particularly tedious part. The contractor having assembled his plant, from now on, up to the mouth of the tunnel, there is no reason why the work should not proceed much more rapidly. I am pushing the contractor with this object in view.

In this connection, I wish to say that the Pennsylvania Railroad has co-operated with us in a most satisfactory manner, with reference to the adjustment of their tracks at the crossing of the Viaduct.

DESIGNING DEPARTMENT.

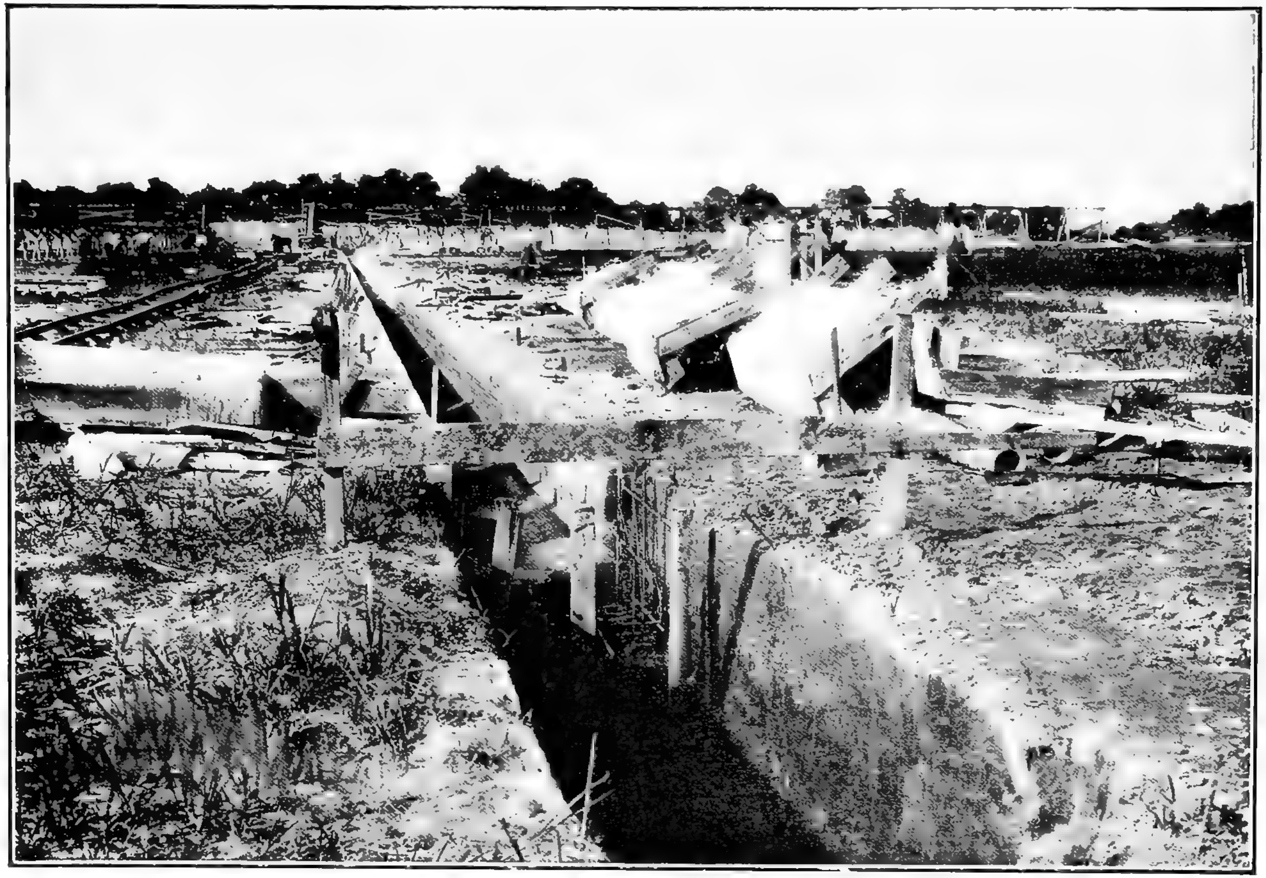
On account of the lack of information regarding underground structures, the very extensive ramifications of the sewerage system, the effort to interfere as little as possible with existing structures, and in order to give the contractor as much information as possible in making his bid, we have necessarily had to make extensive investigations of the records of all the City Departments and public service corporations; and, in addition, sink numerous test-pits. This has resulted in adding to our engineering cost, but it has been the means of effecting large savings to the City, by the contractors giving lower prices on account of having this information, and will result in the City having one of the most complete underground maps of any city in the country. It has also enabled us to do our work with the least possible interference with the structures of other City Departments and public service corporations. This has involved, since the beginning of the work, the preparation of 10,500 drawings. Included in this number are 107 record plats which have been entirely completed, and 383 partially completed. These plats, which form the foundation of our contract drawings, show street, lot and curb lines, existing sewers and drains, tracks, pipes and other structures, with depths, sizes and materials.

During the year 1913 we have passed nearly 19,500 permits for connections to the new sewers, requiring the giving of depth and location, and have examined about 2,500 plans submitted by the other City Departments, public service corporations, etc., to see that the proposed structures did not interfere with our work. In addition, about 2,000 plans were furnished for our information by the Gas Company, Telephone Company, etc. Since the beginning of our work, about 15,000 original drawings have been submitted by outside parties, either for approval or for our information, and about 10,000 additional duplicate drawings have been received, showing revisions or changes from the plans originally submitted, making a total of about 25,000 separate outside drawings passed on since our work began.

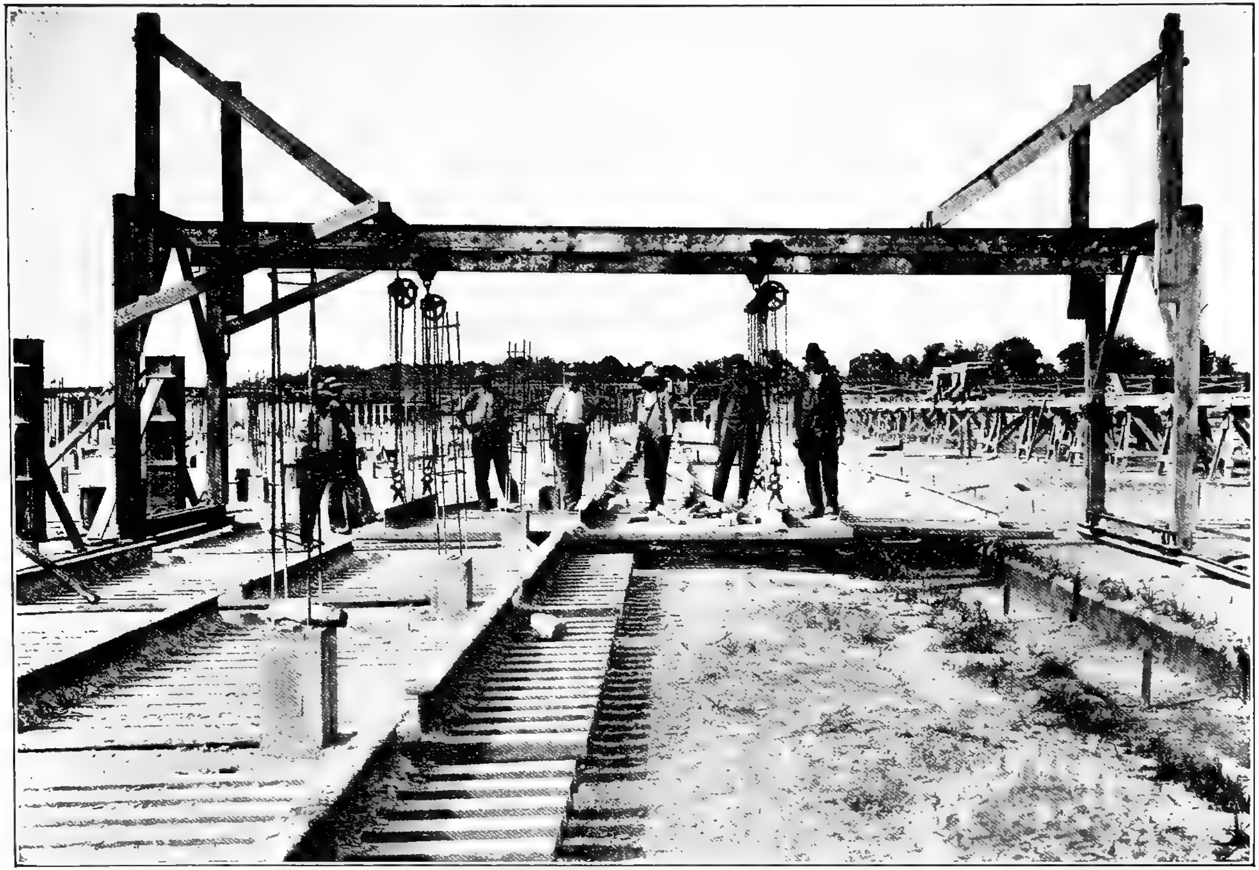
In planning and executing such work as the Baltimore Sewerage System, either one of two diametrically opposed policies may be followed:

First—The plans and preliminary investigations may be of the most general character, leaving it to the contractor to make detailed investigations and to assume all risks of unknown conditions. If this plan is followed the contractor's prices are necessarily high, in order to cover contingencies.

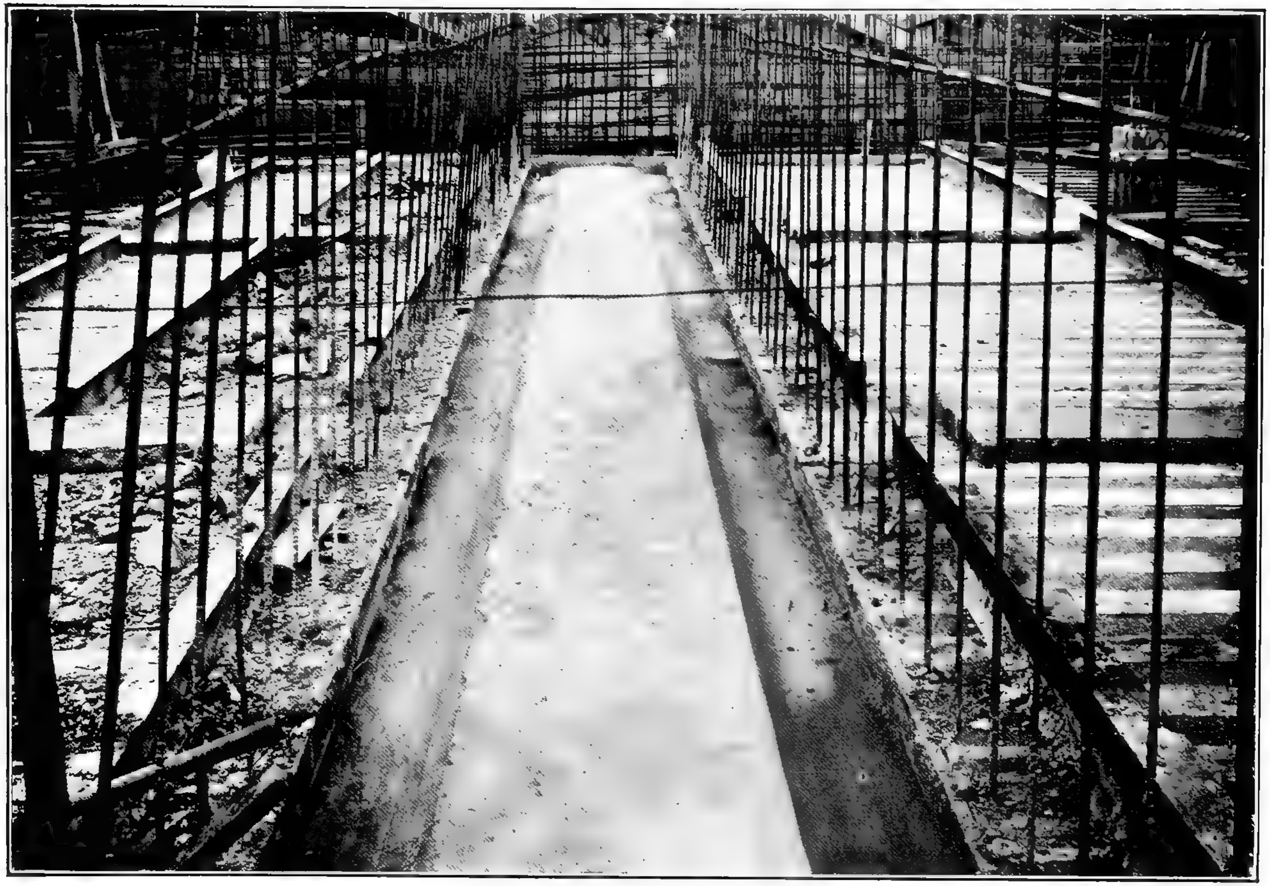
Second—The plans and preliminary studies may be made in great detail, showing, so far as possible, all underground conditions and obstructions, and leaving as few things as possible to be covered by the contractor's allowance for contingencies. This method results in the lowest prices from the contractors and has been adopted by the Sewerage Commis-



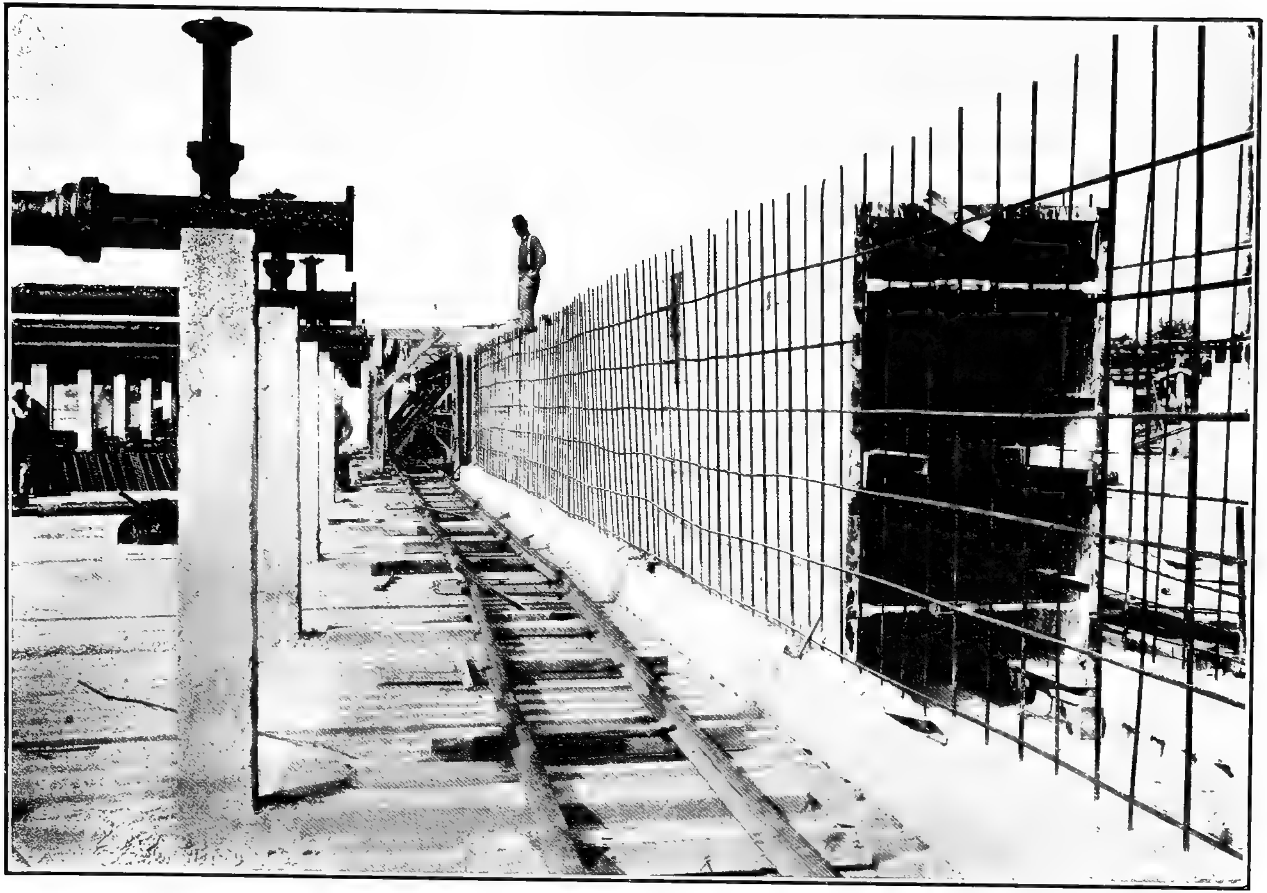
SEWAGE DISPOSAL WORKS.
Excavation for Main Drain Under Sprinkling Filter.



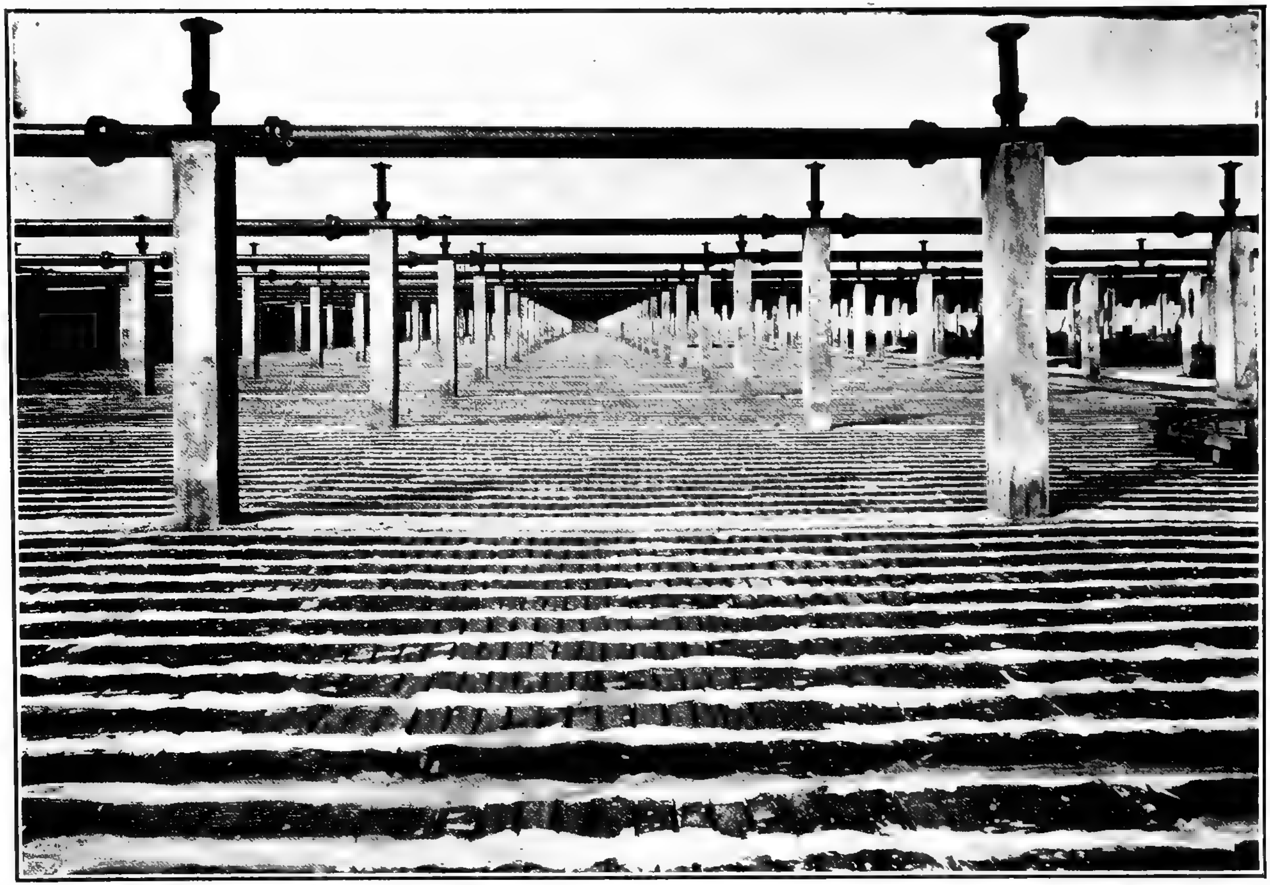
SEWAGE DISPOSAL WORKS.
Gantry Crane for Handling the Forms Used to Shape the Drainage Channels in the Filter Floors,



SEWAGE DISPOSAL WORKS.
Completed Floor of Single Flushing Gallery in Sprinkling Filter.



SEWAGE DISPOSAL WORKS.
Single Flushing Gallery Under Construction, Showing Steel Forms for Side Walls and Roof.



SEWAGE DISPOSAL WORKS.
Completed Floor of Sprinkling Filter and Piping System for Distributing Sewage.

sion, with the result that we have secured very wide competition and generally low prices on all of the work which has been done. The saving secured by the lower prices has been many times greater than the additional cost of preparing the plans along the above lines.

TESTING STATION.

The Sewerage Commission's method of testing their cement and having a complete laboratory producing satisfactory results caused the Mayor and Board of Estimates to decide to place the testing of all cement purchased by the City's contractors under the jurisdiction of the Sewerage Commission. The Sewerage Commission having agreed to this proposition, our cement laboratory force was moved to the City Testing Station in July, 1912. During 1913 the laboratory sampled and tested 2,215 lots (representing 1,810,593 bags) of cement. The larger part of the cement tested was sampled in dealers' warehouses, and each bag was tagged, as the cement was intended to be sold in small quantities to different contractors. The cost of this work (sampling, tagging and testing) was unusually low, amounting to about three-quarters of a cent per bag. Where the cement was purchased in large lots to be used on specific pieces of work, the bags were not tagged, and the cost of sampling and tagging each lot of cement amounted to only $2.04. The Commission bills the cost of operating the Cement Laboratory against the various departments by which the cement is used, the charge to each department being based on the amount of cement used by it.

The brands tested embrace the following: Alpha, Atlas, Dexter, Dragon, Edison, Giant, Lehigh, Matcham, Nazareth, Saylor, Security, Tidewater, Universal, Vulcanite and Whitehall.

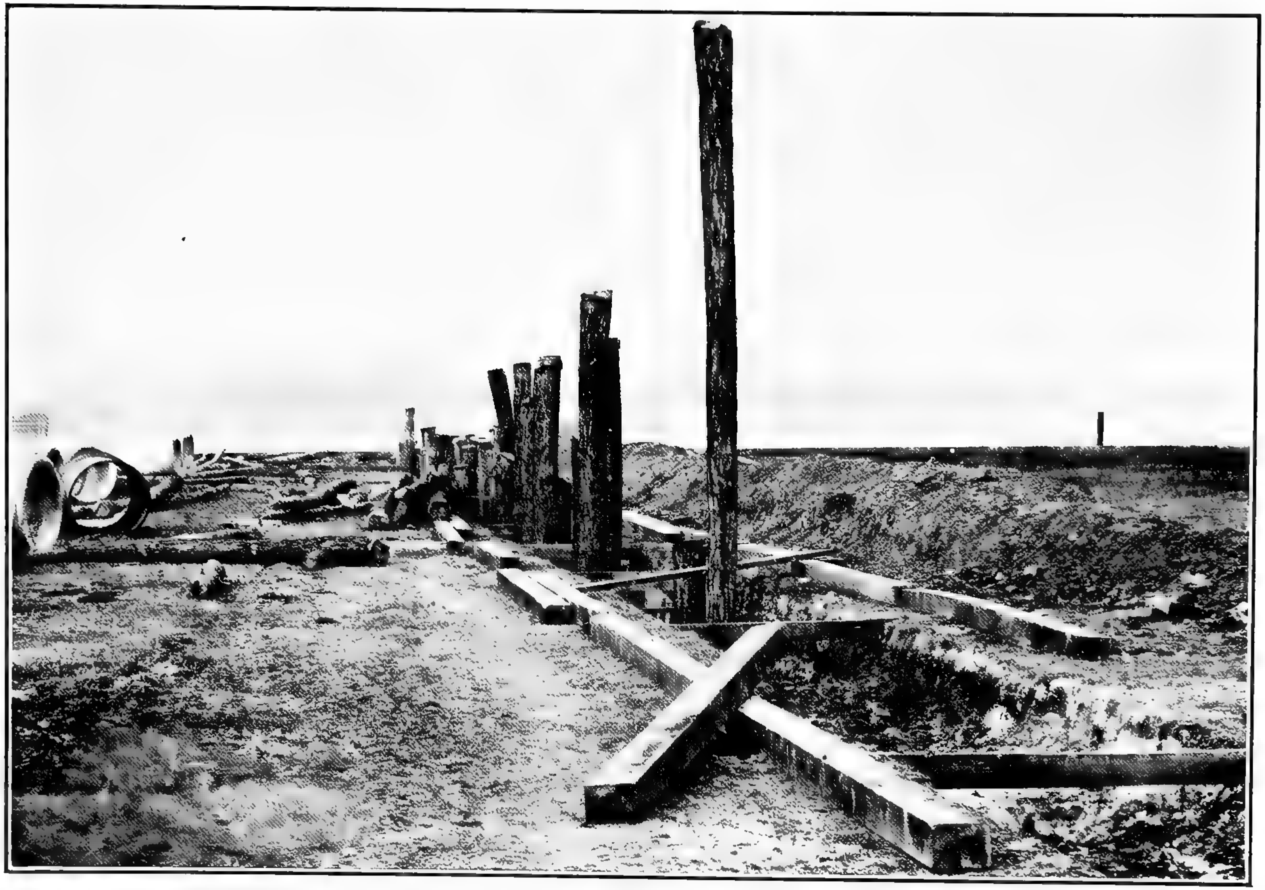
PHOTOGRAPHY.

In the subway construction in New York we found that the use of photography was a most important factor in our engineering work in saving money to the city in law suits. This feature was introduced in the Sewerage Commission's work from the very start and has resulted in producing evidence that has thwarted a great many law suits and enabled the City to win many others. Our method has been to carefully examine buildings before our work was started, and in the case of any defects, have them photographed; also, elevations taken on curbs and sills. While this has added to the first cost, it has, as stated above, enabled us to save large sums to the City.

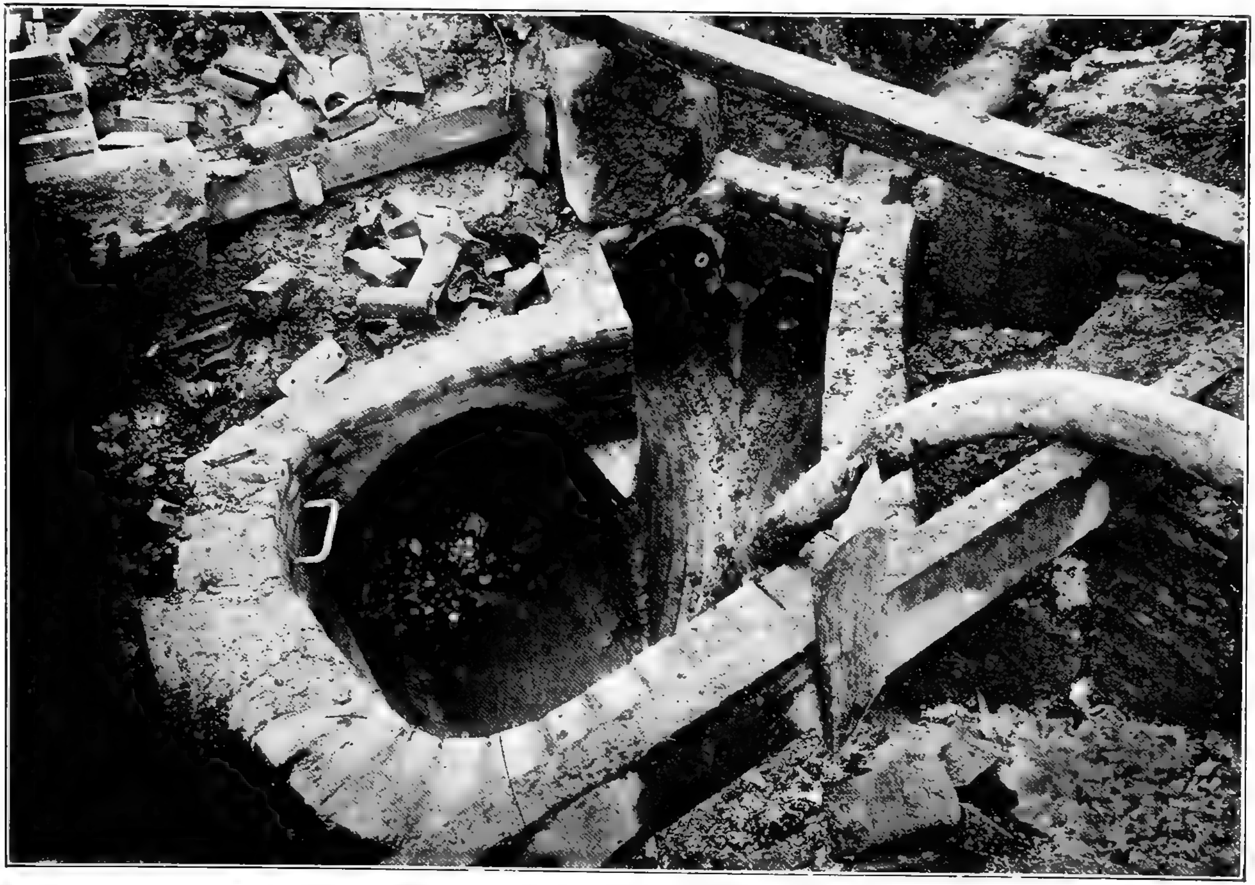
NEW PAVING.

In order to meet the strenuous program of paving adopted by His Honor, the Mayor, I am gratified to report that we have been able to keep well in advance of the paving. On December 12, 1913, we called the attention of the Paving Commission to the fact that we had released about 37 miles of streets, in addition to those they had asked us for, which were then available for paving. Since then, we have released additional streets and are about ready to release a considerable number of miles more. This has only been possible by the most strenuous work on the part of everyone connected with the Sewerage Commission.

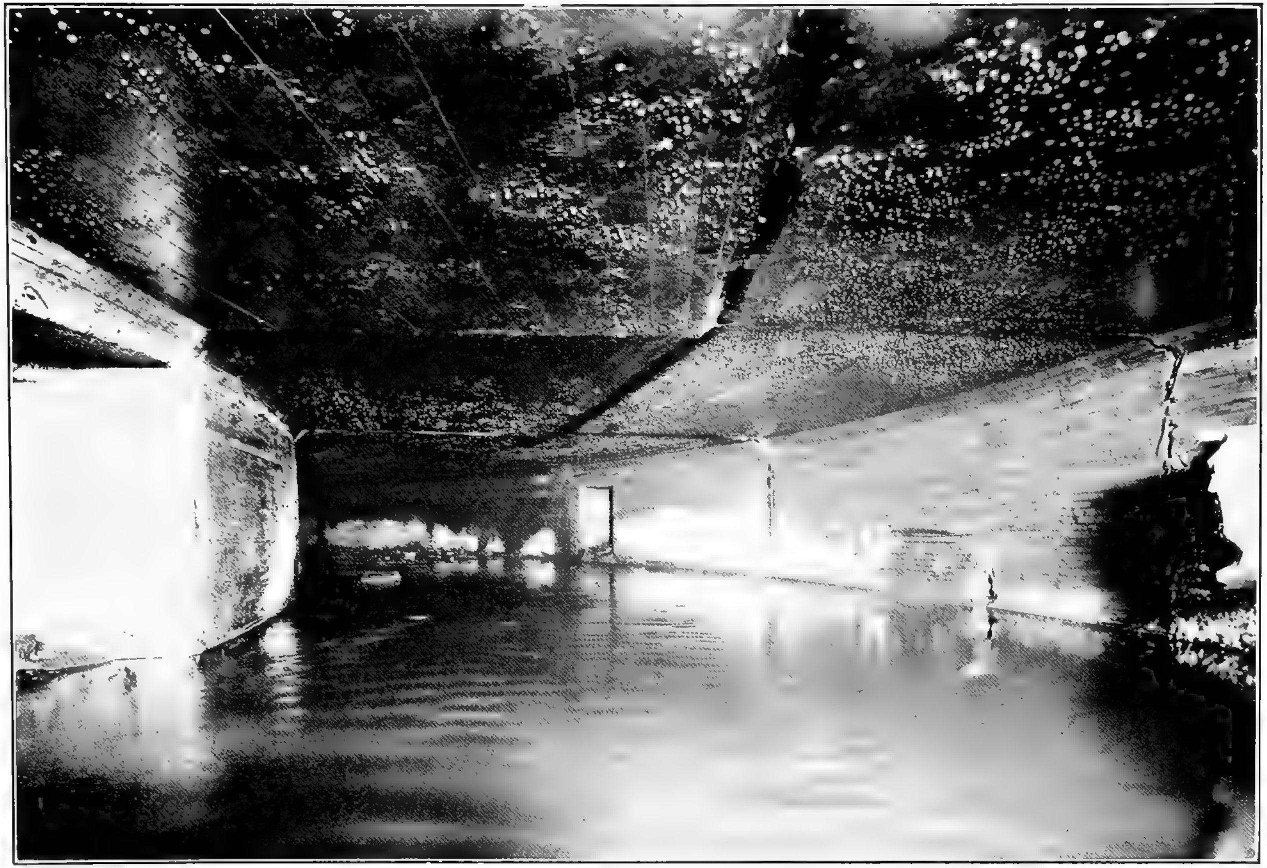
The pushing of the paving so closely behind such extensive sewerage and drainage work has placed the Commission in a very critical position, as the settlement of these trenches, covering such a tremendous area through various kinds of soils and under masses of pipes, makes a contingency that we have used every effort to overcome. It is therefore gratifying to have had practically no replacing of new pavements over our trenches, demonstrating that unusual care has been exercised in our backfilling.



DRIVING PILES FOR FOUNDATION OF OUTLET OF 42-INCH STORM-WATER DRAIN THROUGH SWANN PARK AT McCOMAS STREET.

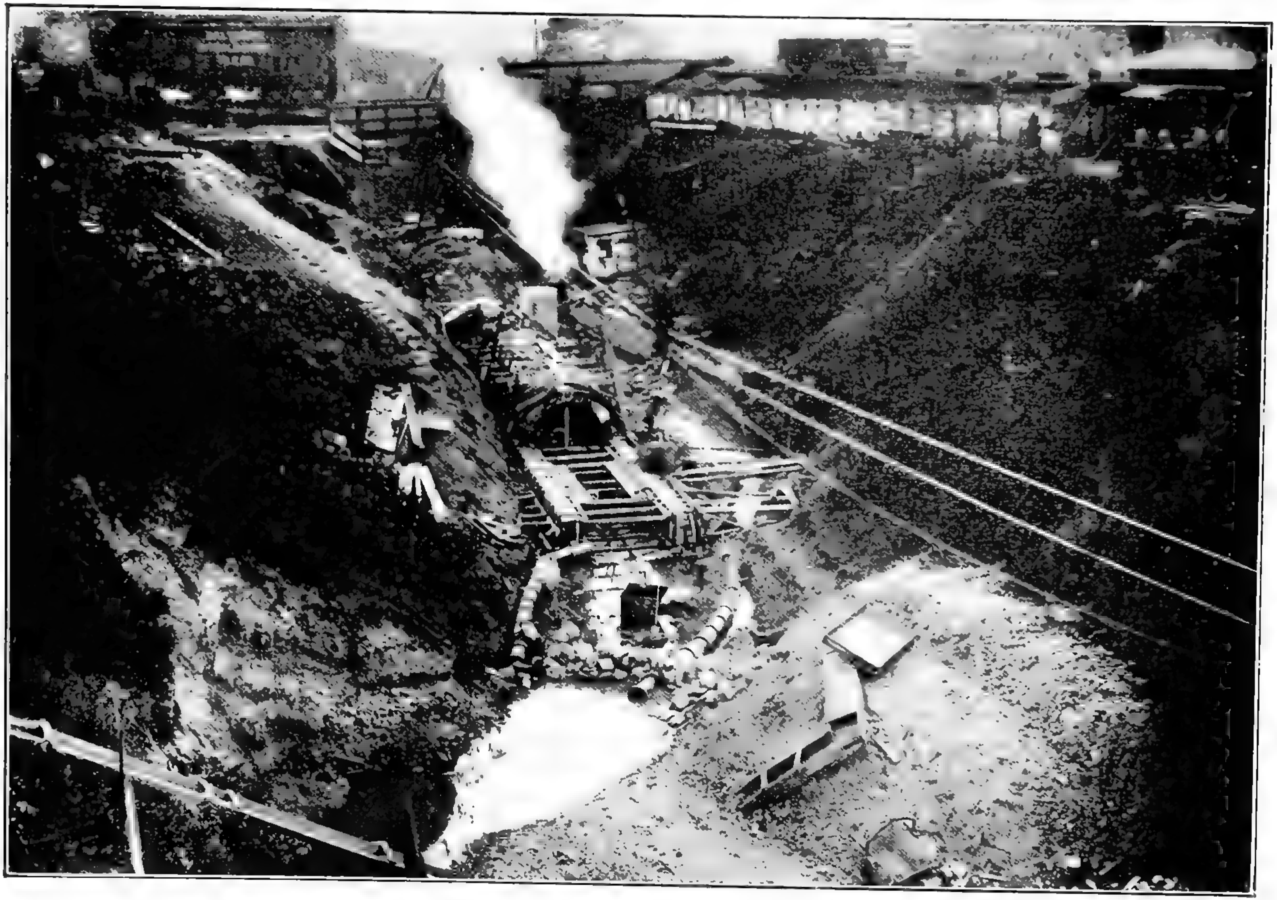


INLET CONNECTION AND MANHOLE ON STORM-WATER DRAIN AT LEADENHALL AND WEST STREETS,



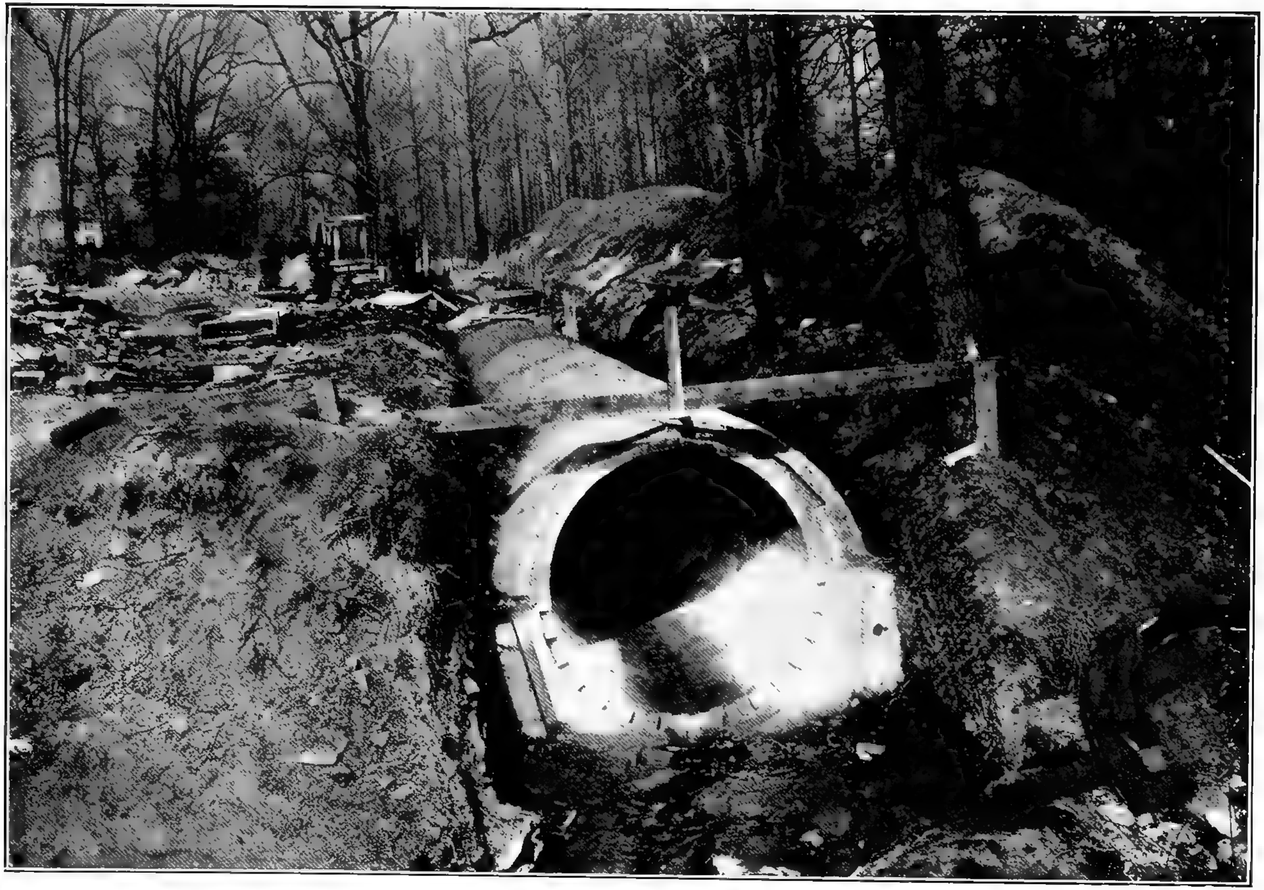
CROSS STREET STORM-WATER DRAIN.

Interior of Reconstructed Section at Race Street. The New Portion Is Built of Reinforced Concrete and Is of Rectangular Section, 9 Feet Wide and 3 Feet High.

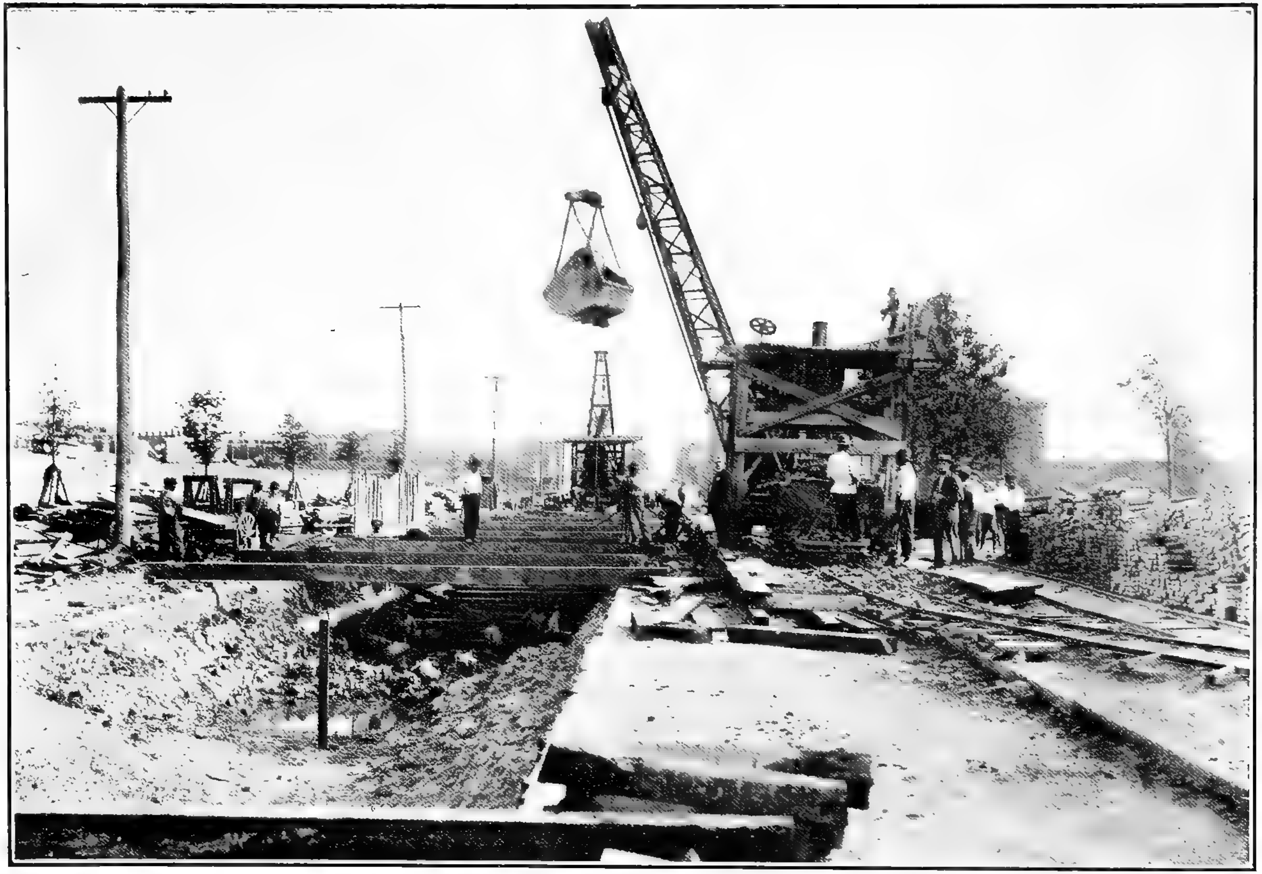


SUMWALT RUN STORM-WATER DRAIN.

Showing Construction in Progress North of Twenty-third Street and Method of Handling the Dry-Weather Flow of the Stream. The Drain Is Horseshoe Shaped and Is 10 Feet Wide by 9 Feet High at This Point.

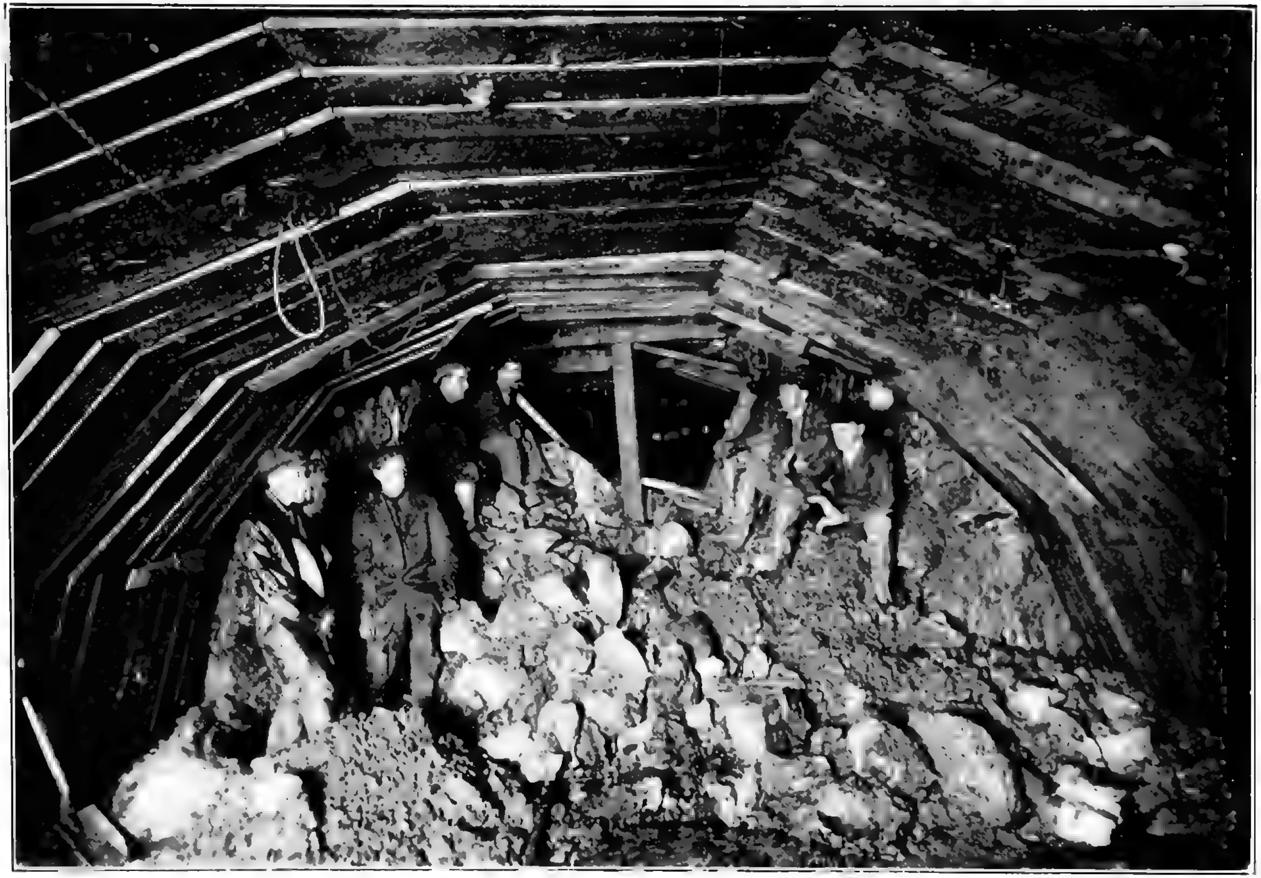


SUMWALT RUN STORM-WATER DRAIN.
Extension in Hargrove Alley, North of Thirty-second Street. The Drain Is 78 Inches in Diameter and Is Built of Concrete With Brick-Lined Invert.

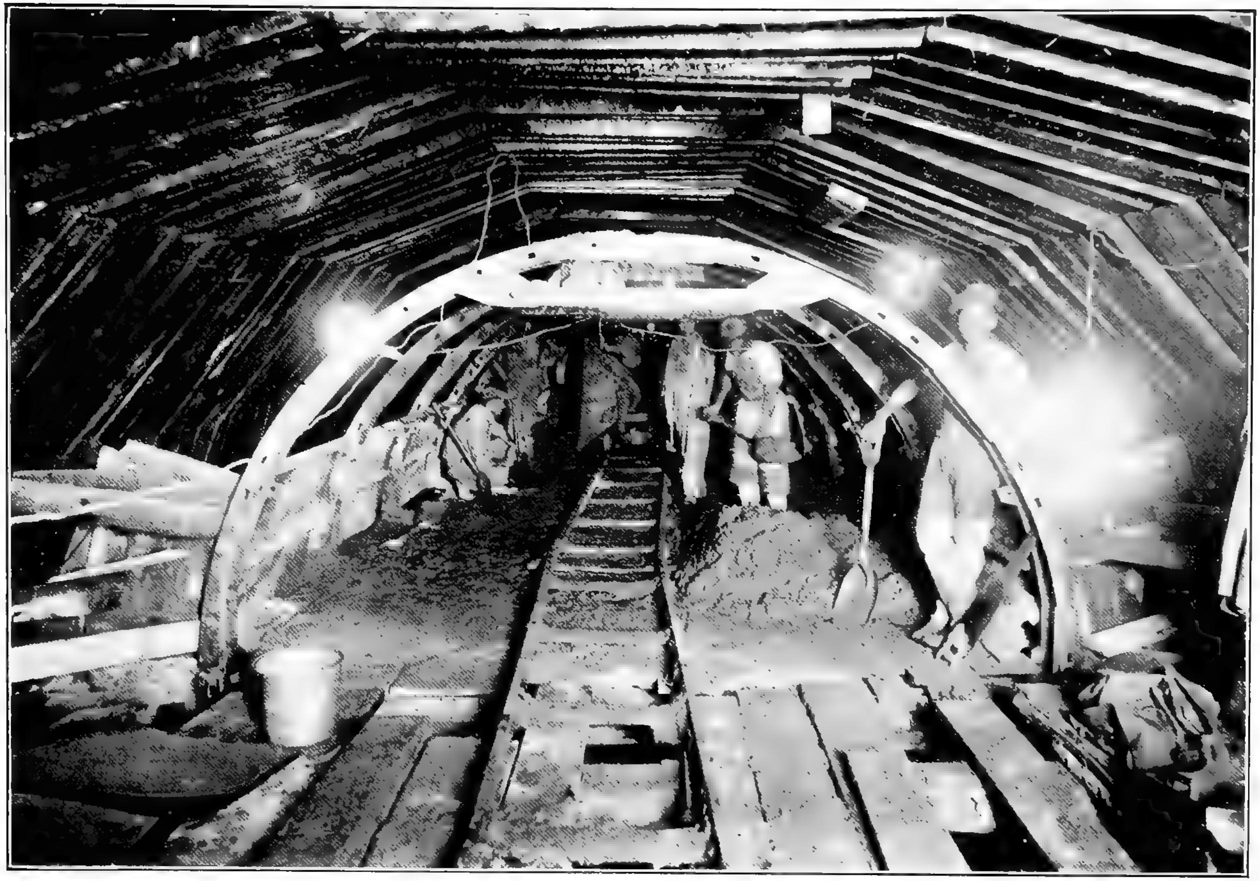


OGIER'S RUN INTERCEPTING STORM-WATER DRAIN.

Starting Excavation of Trench With a Locomotive Crane, Which Was Used to a Depth of About Ten Feet, the Excavation Was Then Completed With the Cableway. The Pipe on the Left-Hand Side of the Trench Is a 12-Inch Water Main.

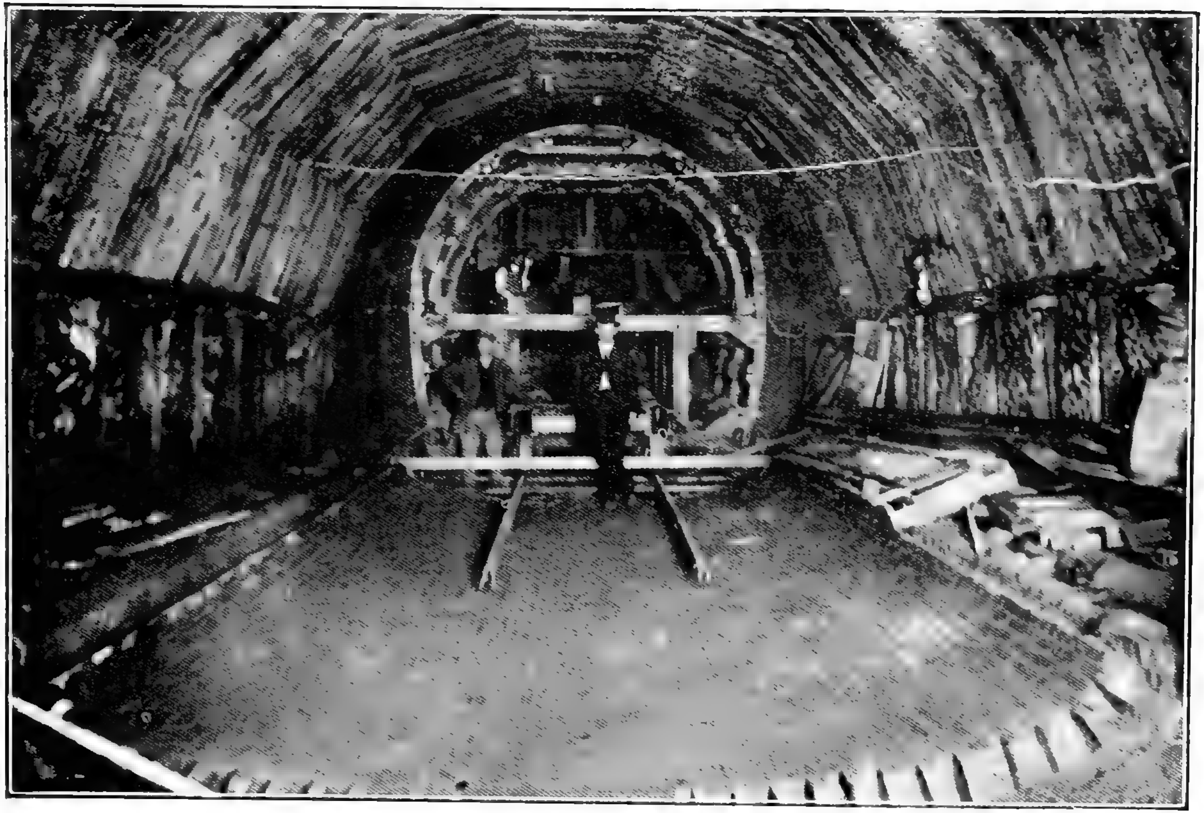


OGIER'S RUN INTERCEPTING STORM-WATER DRAIN.
Tunnel Under Linwood Avenue, Between Fleet Street and Fait Avenue, Showing Segmental Timbering of Roof of Tunnel and Meeting of Headings.



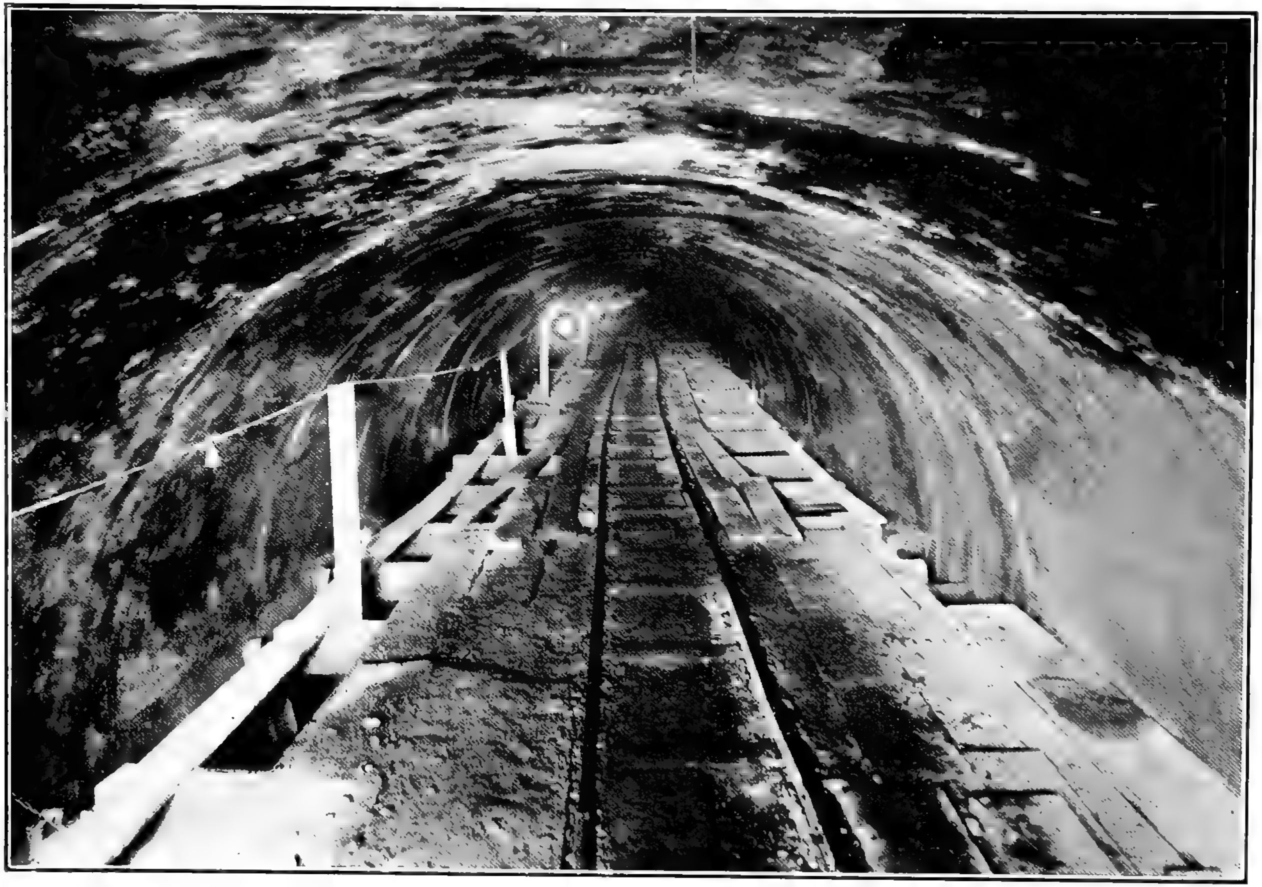
OGIER'S RUN INTERCEPTING STORM-WATER DRAIN.

Placing Concrete in Arch. The Steel Lagging of the Forms Is Carried Up in Sections as the Concrete Is Deposited, The Drain Is Horseshoe Shaped, and Is 12 Feet 3 Inches High and 12 Feet 3 Inches Wide,



OGIER'S RUN INTERCEPTING STORM-WATER DRAIN.

Showing Segmental Timbering of Roof, Steel-Centered Forms for Concrete Lining of Arch, and Completed Brick Invert. This Drain Is Horseshoe Shaped and Is 12 Feet 3 Inches High and 12 Feet 3 Inches Wide.



OGIER'S RUN INTERCEPTING STORM-WATER DRAIN.
Completed Interior of Arch. The Concrete Was Mixed by Mechanical Mixers, Located at the Shafts and Was Conveyed to Place by Means of the Construction Track Shown.

The proper construction and efficiency of sewers and drains depends on carefully constructing them on calculated grades; and the further fact that sewer work is so quickly covered, makes it a class of work requiring most careful inspection, from both an engineering and inspection standpoint.

I have introduced 50 photographs and 5 tables showing the actual work in progress, in detail, which will give the layman a better idea of the magnitude and variety of the engineering work.

Respectfully submitted,

CALVIN W. HENDRICK,
Chief Engineer.

TABLE No. 1

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
Thomas D. Pitts	First Assistant	June 4, 1906	
Oliver W. Connet	Division Engineer	Jan. 2, 1906	
Alfred H. Hartman	Division Engineer	Jan. 15, 1906	
H. C. McRae	Division Engineer	Jan. 21, 1907	
W. A. Megraw	Office Engineer	Dec. 3, 1906	Promoted from Asst. Div. Engr. Jan. 1, 1913.
F. H. Cronin	Mechanical Engineer	May 9, 1911	
John J. Neal	Asst. Mech. Engineer	Nov. 9, 1906	Trans. from Asst. Engr. "AA" Jan. 1, 1913.
John J. Frederick	Secretary	Oct. 1, 1905	
J. Fletcher Apsey	Asst. Div. Engineer	Jan 15, 1906	Resigned May 5, 1913.
R. L. Burwell	Asst. Div. Engineer	June 24, 1907	
Milton J. Ruark	Asst. Div. Engineer	Jan. 22, 1906	Promoted from Asst. Eng. "AA" Jan. 1, 1913.
Elliott H. Burwell	Asst. Div. Engineer	Jan. 15, 1906	Promoted from Asst Engr. "AA" May 1, 1913.
Gustav J. Requardt	Asst. Div. Engineer	June 23, 1909	Promoted from Asst. Engr. "A" May 1, 1913.
Covington K. Allen	Asst. Engineer "AA"	June 1, 1907	Resigned July 1, 1913.
Henry S. Shryock	Asst. Engineer "AA"	May 1, 1906	
Arthur C. Toner	Asst. Engineer "AA"	Jan. 15, 1906	Resigned Dec. 31, 1913.
F. W. McKinney	Asst. Engineer "AA"	Jan. 1, 1912	Resigned June 16, 1913.
Henry S. Regester, Jr.	Asst. Engineer "AA"	Jan. 15, 1906	Promoted from Asst. Engr. "A" June 16, 1913.
Frank H. Firoved	Asst. Engineer "AA"	Jan. 23, 1906	Promoted from Asst. Engr. "A" Jan. 1, 1913.
Frank J. Parran	Asst. Engineer "A"	May 28, 1907	
Harry F. Schaefer	Asst. Engineer "A"	June 20, 1907	
John Moore, Jr.	Asst. Engineer "A"	May 16, 1907	
Robert Rumbold	Asst. Engineer "A"	Feb. 1, 1906	
F. D. Christhilf	Asst. Engineer "A"	July 7, 1909	

TABLE No. 1—*Continued.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
J. Elmer Shepperd	Asst. Engineer "A"	July 2, 1906	
C. Boone Sadler	Asst. Engineer "A"	Aug. 1, 1907	
Edmund P. Burke	Asst. Engineer "A"	Mar. 27, 1912	
S. M. Klein	Asst. Engineer "A"	Jan. 8, 1912	Resigned May 15, 1913.
Ralph Hutchins	Asst. Engineer "A"	Feb. 1, 1906	Promoted from Asst. Engr. "B" April 1, 1913.
J. H. Ensey	Asst. Engineer "A"	Nov. 29, 1911	Promoted from Asst. Engr. "B" Aug. 1, 1913.
G. Herman Carl	Asst. Engineer "A"	Aug. 1, 1911	Promoted from Asst. Engr. "B" Jan. 15, 1913.
J. M. Bandel	Asst. Engineer "A"	Mar. 18, 1912	Promoted from Asst. Engr. "B" Aug. 1, 1913.
Irving P. Kane	Asst. Engineer "A"	May 22, 1912	Promoted from Asst. Engr. "B" Jan. 15. 1913.
C. I. Haven	Asst. Engineer "A"	June 17, 1912	Promoted from Inspr. "C" to Inspr. "B" May 1, 1913; to Asst. Engr. "A" July 1, 1913.
George W. Townsend	Asst. Engineer "A"	Nov. 18, 1907	Promoted from Draftsman "A" Jan. 1, 1913.
S. O. S. Graham	Asst. Engineer "A"	May 21, 1913	
Leslie C. Frank	Asst. Engineer "A"	Aug. 1, 1911	Resigned Oct. 15, 1912; reappointed Sept. 17, 1913.
J. Wightman Cleaveland	Asst. Engineer "B"	Dec. 24, 1906	
J. Milton Knight	Asst. Engineer "B"	Aug. 4, 1908	
J. Lee Chapman	Asst. Engineer "B"	Nov. 15, 1911	Resigned July 1, 1911.
R. Taylor Tunstall	Asst. Engineer "B"	Jan. 15, 1906	
Harry M. Webb	Asst. Engineer "B"	June 1, 1909	
J. S. Thompson, Jr.	Asst. Engineer "B"	Oct. 3, 1911	
Paul Wroth	Asst. Engineer "B"	May 19, 1908	
H. W. Johenning	Asst. Engineer "B"	June 24, 1908	
Thomas W. Sasscer	Asst. Engineer "B"	May 20, 1908	Promoted from Inspector "C" May 1, 1913.
W. S. Wicker	Asst. Engineer "B"	June 4, 1912	Promoted from Inspector "C" to "B" July 1, 1913; transferred to Asst. Engr. "B" Nov. 15, 1913.

TABLE No. 1—*Continued.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
E. B. Gilmour	Asst. Engineer “B”	June 12, 1911	Promoted from Draftsman “C” to “A” Jan. 1, 1913; transferred to Asst. Engr. “B” May 1, 1913.
Carroll Edgar	Asst. Engineer “B”	Oct. 4, 1912	Promoted from Draftsman “C” May 1, 1913.
Julius O. Ziegfield	Asst. Engineer “B”	April 18, 1912	Promoted from Draftsman “C” Sept. 15, 1913.
Dudley G. Frazer	Asst. Engineer “B”	Aug. 1, 1911	Promoted from Rodman “A” July 1, 1913.
William J. Frere, Jr.	Asst. Engineer “B”	June 6, 1911	Promoted from Rodman “A” July 1, 1913.
William C. Briscoe	Asst. Engineer “B”	Nov. 16, 1909	Promoted from Rodman “A” Jan. 15, 1913.
Adam W. Gerlach	Asst. Engineer “B”	June 16, 1909	Promoted from Stenog. “A” April 1, 1913.
W. L. Prout	Asst. Engineer “B”	April 5, 1911	Promoted from Stenog. “A” May 1, 1913.
H. G. Maynard	Asst. Engineer “B”	June 23, 1909	Promoted from Inspector “C” to “B” Feb. 15. 1913; transferred to Asst. Engr. “B” Nov. 15, 1913.
C. J. Hellen	Asst. Engineer “B”	June 12, 1911	Promoted from Rodman “A” Oct. 1, 1913.
Edward F. Davis	Inspector “A”	Dec. 24, 1906	
Charles S. York	Inspector “A	Nov. 7, 1906	
John H. Sothoron	Inspector “A”	July 5, 1907	
Charles I. Hammond	Inspector “A”	Nov. 7, 1906	
Aulbin D. Tapscott	Inspector “A”	Nov. 19, 1906	
George T. Robinson	Inspector “A”	June 1, 1907	Resigned Aug. 1, 1913.
Walter J. Caple	Inspector “A”	July 5, 1907	Resigned Nov. 30, 1913.
John C. Strohm	Inspector “A”	Jan. 15, 1906	Promoted from Inspector “B” Aug. 1, 1913.
Stephen A. Lusby	Inspector “B”	April 6, 1907	
Henry A. Albert	Inspector “B”	June 1, 1907	

TABLE No. 1—*Continued.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
John F. Garrett	Inspector "B"	Nov. 16, 1906	
Karl E. G. Kaufman	Inspector "B"	Jan. 15, 1906	
F. DeWolf Theobald	Inspector "B"	Aug. 9, 1907	
George E. Schaeffer	Inspector "B"	Aug. 11, 1908	
E. B. Richards	Inspector "B"	Jan. 15, 1906	Resigned Oct. 15, 1913.
J. H. Gambrell	Inspector "B"	Jan. 15, 1906	
William H. Bell	Inspector "B"	Dec. 19, 1906	
William Byrd	Inspector "B"	June 1, 1907	Promoted from Inspector "C" Jan. 1, 1913.
George B. Roberts	Inspector "B"	June 23, 1909	Promoted from Inspector "C" Aug. 1, 1913.
Lawrence H. Francis	Inspector "B"	Jan. 15, 1906	Promoted from Inspector "C" June 16, 1913.
William F. Dolliver	Inspector "B"	July 7, 1909	Promoted from Inspector "C" May 1, 1913.
Norman E. Brice	Inspector "B"	May 25, 1912	Promoted from Inspector "C" May 1, 1913.
E. W. Magruder	Inspector "B"	June 13, 1912	Promoted from Inspector "C" May 1, 1913; resigned May 15, 1913.
R. E. L. Martin	Inspector "B"	April 18, 1912	Promoted from Inspector "C" July 1, 1913.
Claude R. Whitaker	Inspector "B"	April 1, 1912	Promoted from Inspector "C" July 1, 1913.
A. I. Mulliken	Inspector "B"	July 21, 1913	Promoted from Inspector "C" Dec. 1, 1913.
J. C. Marlatt	Inspector "B"	May 16, 1912	Promoted from Inspector "C" May 1, 1913.
William A. Brogden	Inspector "C"	Nov. 7, 1906	
Henry Kelly	Inspector "C"	July 17, 1907	Dropped June 4, 1913.
A. S. Bartholomaei	Inspector "C"	Oct. 9, 1907	
William J. Boyle	Inspector "C"	April 16, 1907	Dropped April 1, 1913.
Martin W. Garrett	Inspector "C"	July 19, 1908	
John Lynch	Inspector "C"	June 1, 1909	
John Dougherty	Inspector "C"	May 17, 1909	

TABLE No. 1—*Continued*.

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
D. W. Glass	Inspector "C"	Dec. 26, 1911	Promoted from Inspector "D" April 1, 1913; resigned Oct. 1, 1913.
William Wagner	Inspector "C"	Jan. 15, 1906	
John T. Merritt	Inspector "C"	Nov. 29, 1911	
W. Knight Potter	Inspector "C"	Oct. 3, 1911	
W. K. Vickers	Inspector "C"	Oct. 17, 1911	
Stuart Anderson	Inspector "C"	Feb. 5, 1912	
A. J. Carey	Inspector "C"	May 14, 1912	Promoted from Inspector "D" April 1, 1913.
Newell D. Chase	Inspector "C"	April 3, 1912	Resigned Oct 31, 1913.
Louis Cremona	Inspector "C"	May 1, 1912	
H. R. Devilbiss	Inspector "C"	May 8, 1912	Promoted from Inspector "D" April 1, 1913.
L. N. Fisher	Inspector "C"	June 17, 1912	Resigned Sept. 23, 1913.
Alfred P. Gwynn	Inspector "C"	Oct. 24, 1912	Promoted from Inspector "D" May 1, 1913.
Thomas S. Hauch	Inspector "C"	May 7, 1912	Resigned Feb. 18, 1913.
William E. Hearing	Inspector "C"	Mar. 14, 1912	
George Kenly	Inspector "C"	Oct. 3, 1912	Promoted from Inspector "D" April 1, 1913;
L. F. Magness	Inspector "C"	June 17, 1912	Resigned Sept. 1, 1912; reappointed June 24, 1913; resigned Sept. 1, 1913.
Vincent T. Malcolm	Inspector "C"	April 24, 1912	
Kenneth T. Murphy	Inspector "C"	June 25, 1913	Promoted from Inspector "D" Dec. 15, 1913.
H. H. Tunis	Inspector "C"	June 19, 1913	
C. O. Boyd	Inspector "C"	June 23, 1913	
George R. Roberts	Inspector "C"	July 14, 1913	Resigned July 26, 1913.
R. D. Welsh	Inspector "C"	June 24, 1913	Promoted from Rodman "A" Dec. 15, 1913.
E. C. Densten	Inspector "C"	July 21, 1913	

TABLE No. 1—*Continued.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
W. C. Geissler	Inspector "C"	July 24, 1913	Promoted from Inspector "D" Dec. 15, 1913.
R. E. Turley	Inspector "C"	July 22, 1913	Promoted from Inspector "D" Dec. 15, 1913.
W. T. Stone	Inspector "C"	Aug. 1, 1913	Resigned Aug. 30, 1913.
Martin G. Shields	Inspector "C"	April 18, 1913	
A. A. Dyer	Inspector "C"	April 18, 1913	
Chas. Hildebrand, Jr.	Inspector "C"	Sept. 4, 1913	Promoted from Inspector "D" Dec. 1, 1913.
R. B. Warren	Inspector "C"	Nov. 6, 1912	Promoted from Inspector "D" Oct. 1, 1913.
John Yearwood	Inspector "C"	May 15, 1913	
Roland W. Bates	Inspector "C"	April 15, 1913	
C. W. Henderson	Inspector "C"	July 7, 1909	Resigned Sept. 18, 1909; reappointed April 21, 1913.
J. K. Bosee	Inspector "C"	April 21, 1913	Promoted from Inspector "D" Aug. 15, 1913.
W. C. Begg	Inspector "C"	July 24, 1913	Promoted from Inspector "D" Dec. 15, 1913.
F. H. Plack	Inspector "C"	June 16, 1913	Promoted from Inspector "D" Dec. 1, 1913.
C. M. Fuller	Inspector "C"	June 16, 1913	Promoted from Inspector "D" Dec. 1, 1913.
S. A. Merriam	Inspector "C"	June 5, 1913	Dropped July 16, 1913.
G. G. B. Nelson	Inspector "C"	Mar. 18, 1912	Laid off Jan. 1, 1913.
J. A. Reynolds	Inspector "C"	Oct. 17, 1912	
Joseph W. Rogers	Inspector "C"	April 24, 1912	Resigned April 22, 1913.
H. T. Sasscer	Inspector "C"	June 6, 1912	Promoted from Inspector "D" April 1, 1913.
Charles P. Schlarb	Inspector "C"	June 1, 1912	Promoted from Inspector "C" Feb. 1, 1913.
John E. Sheridan	Inspector "C"	Feb. 16, 1912	
Ballard R. Smith	Inspector "C"	June 1, 1912	Promoted from Inspector "D" June 1, 1913.
C. F. Tausky	Inspector "C"	Mar. 20, 1912	
G. E. Warren	Inspector "C"	June 17, 1912	Resigned April 1, 1913.

TABLE No. 1—*Continued.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
L. B. Williams	Inspector "C"	Oct. 25, 1912	Resigned Mar. 17, 1913.
L. Chase Wright	Inspector "C"	June 17, 1912	Resigned April 15, 1913.
W. Howard Corddry	Inspector "C"	May 1, 1912	Promoted from Draftsman "C" April 1, 1913.
M. W. Loving	Inspector "C"	June 25, 1912	Promoted from Draftsman "C" Dec. 1, 1913.
L. Carroll Miller	Inspector "C"	Jan. 25, 1906	Promoted from Rodman "A" Sept. 1, 1913.
Edwin H. Nordman	Inspector "C"	April 17, 1912	Promoted from Rodman "A" Jan. 1, 1913.
Charles W. Rose	Inspector "C"	Oct. 14, 1912	Promoted from Rodman "A" July 1, 1913.
S. T. W. Green	Inspector "C"	Jan. 2, 1912	Promoted from Rodman "B" to Rodman "A" Jan. 1, 1913, to Inspector "C" July 1, 1913.
L. E. Massey	Inspector "D"	Nov. 6, 1912	Resigned Mar. 17, 1913.
J. Robert Owens	Inspector "D"	April 15, 1912	
L. D. Sasscer	Inspector "D"	May 15, 1912	
M. J. Slingluff	Inspector "D"	Oct. 14, 1912	
Edwin J. Wolfe	Inspector "D"	June 1, 1912	
E. Bernard Green	Inspector "D"	April 10, 1912	Promoted from Rodman "B" Aug. 1, 1913.
E. H. Howard	Inspector "D"	Mar. 8, 1912	Promoted from Rodman "B" April 15, 1913.
Herbert N. Chipchase	Inspector "D"	Nov. 1, 1911	
H. C. Brooks	Inspector "D"	Oct. 16, 1912	
J. B. Maguire	Inspector "D"	Oct. 11, 1912	
W. G. Nicholson	Inspector "D"	May 15, 1913	Dropped June 26, 1913.
J. C. Spedden	Inspector "D"	May 19, 1913	
P. R. Powell	Inspector "D"	June 9, 1913	Resigned Dec. 31, 1913.
H. W. Driver	Inspector "D"	June 18, 1913	Resigned Sept. 15, 1913.
D. S. Craig	Inspector "D"	June 23, 1913	Resigned Nov. 10, 1913.
L. V. Keeler	Inspector "D"	June 23, 1913	

TABLE No. 1—*Continued.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
George F. Shaw	Inspector "D"	July 28, 1913	
John T. Brooks	Inspector "D"	Sept. 8, 1913	Resigned Sept. 20, 1913.
C. A. Kastendike	Inspector "D"	Sept. 6, 1913	
J. K. Kearney	Inspector "D"	Oct. 22, 1913	
Theo. C. Schaetzle	Inspector "D"	July 29, 1913	
William R. Seth	Inspector "D"	Oct. 6, 1913	
Claude A. Murphy	Draftsman "A"	Jan. 15, 1906	
Maurice F. Rodgers	Draftsman "A"	Dec. 1, 1905	
Clarence G. Harig	Draftsman "A"	April 20, 1908	
Robert Dall, Jr.	Draftsman "A"	July 18, 1910	
Horace A. Brown	Draftsman "A"	July 5, 1907	
Thomas D. Conn	Draftsman "B"	Nov. 21, 1910	Promoted from Draftsman "C" April 1, 1913.
C. Edgar Wood	Draftsman "B"	Oct. 3, 1911	Promoted from Draftsman "C" July 1, 1913.
Samuel Appleby	Draftsman "B"	Aug. 1, 1911	Promoted from Draftsman "C" July 1, 1913.
C. F. Black	Draftsman "B"	June 12, 1911	Promoted from Draftsman "C" May 1, 1913.
Albert C. Betz	Draftsman "B"	May 1, 1912	Promoted from Draftsman "C" July 1, 1913.
W. Graham Cole	Draftsman "B"	June 3, 1912	Promoted from Draftsman "C" July 1, 1913.
William L. Iardella	Draftsman "B"	Mar. 3, 1911	Promoted from Draftsman "C" April 15, 1913.
C. L. Ofenstein	Draftsman "B"	Nov. 1, 1912	Promoted from Draftsman "C" Aug. 1, 1913.
P. F. Davenport	Draftsman "C"	April 16, 1912	
C. J. Flayhart	Draftsman "C"	June 13, 1912	
E. M. Hamilton	Draftsman "C"	July 3, 1912	Dropped June 1, 1913.
Walter E. Lee	Draftsman "C"	Dec. 9, 1912	Resigned Feb. 15, 1913.
D. H. Lucchesi, Jr.	Draftsman "C"	May 7, 1912	
Samuel A. Mazer	Draftsman "C"	June 3, 1912	

TABLE No. 1—*Continued.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
J. L. Miller	Draftsman "C"	April 24, 1912	
W. K. Miller	Draftsman "C"	July 29, 1912	
George McLean	Draftsman "C"	May 1, 1912	Resigned Oct. 1, 1912; reappointed July 2, 1913; resigned Oct. 1, 1913.
Walter J. O'Neill	Draftsman "C"	Oct. 10, 1912	
Edwin A. Plitt	Draftsman "C"	Nov. 14, 1912	
Leslie B. Pope	Draftsman "C"	April 3, 1912	Resigned Aug. 15, 1913.
Richard J. Reese	Draftsman "C"	Sept. 25, 1912	
William C. Runge	Draftsman "C"	Oct. 21, 1912	
Herman A. Schneider	Draftsman "C"	April 12, 1912	
A. L. Shalowitz	Draftsman "C"	Oct. 1, 1912	
John K. Siems	Draftsman "C"	Nov. 11, 1912	
William H. Siems	Draftsman "C"	May 7, 1912	Resigned April 24, 1913.
E. Tschudy	Draftsman "C"	July 31, 1913	
Milton D. Swartz	Draftsman "C"	Oct. 24, 1913	
H. S. Steelman	Draftsman "C"	Sept. 4, 1913	
Otto F. Manger	Draftsman "C"	Feb. 24, 1913	
C. E. Keefer	Draftsman "C"	May 24, 1913	
J. Albert Schad	Draftsman "C"	June 12, 1913	Resigned Sept. 15, 1913.
Charles F. Gross	Draftsman "C"	June 16, 1913	Resigned July 30, 1913.
W. J. Kellinger	Draftsman "C"	June 23, 1913	Resigned July 4, 1913.
Ronald T. Anderson	Draftsman "C"	Nov. 3, 1913	
J. W. Faulconer	Draftsman "C"	April 24, 1913	
Edwin Fitzell	Draftsman "C"	Aug. 2, 1913	
J. Arthur Clark	Rodman "A"	June 10, 1912	Promoted from Draftsman "C" April 15, 1913.

TABLE No. 1—*Continued.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
Harry P. Poole	Rodman "A"	May 16, 1912	Transferred from Draftsman "C" Oct. 1, 1913.
J. Franklin Diggs	Rodman "A"	Oct. 3, 1911	
William A. Twamley	Rodman "A"	Dec. 4, 1911	
Wilford H. Herbert	Rodman "A"	July 16, 1906	
Owen Laws	Rodman "A"	June 3, 1912	
C. F. Martin	Rodman "A"	May 13, 1912	
John T. Rooney	Rodman "A"	July 1, 1912	
A. H. Wernsdorfer	Rodman "A"	Mar. 18, 1912	
William B. O'Connor	Rodman "A"	Oct. 17, 1911	Promoted from Rodman "B" Feb. 1, 1913.
C. G. Walker	Rodman "A"	Dec. 1, 1911	Promoted from Rodman "B" Feb. 1, 1913.
A. T. Hilton	Rodman "A"	Oct. 3, 1911	Promoted from Rodman "B" July 1, 1913.
J. P. Joynes	Rodman "A"	June 12, 1911	Promoted from Rodman "B" Aug. 1, 1913.
C. D. Cann	Rodman "A"	June 14, 1912	Promoted from Rodman "B" Jan. 1, 1913; resigned Nov. 15, 1913.
Ray F. Gildea	Rodman "A"	Aug. 1, 1912	Promoted from Rodman "B" April 15, 1913.
F. L. Maier	Rodman "A"	June 24, 1912	Promoted from Rodman "B" July 1, 1913.
Joseph P. McCafferty	Rodman "A"	June 24, 1912	Promoted from Rodman "B" July 1, 1913.
Thomas G. Stowe	Rodman "A"	Feb. 19, 1912	Promoted from Rodman "B" Dec. 1, 1913.
Charles E. Woollen	Rodman "A"	April 25, 1913	
A. W. Fuchs	Rodman "A"	June 24, 1913	
J. P. Bonner	Rodman "A"	Aug. 15, 1913	Resigned Aug. 26, 1913.
R. E. L. Williams	Rodman "A"	April 2, 1913	
E. H. Compton	Rodman "A"	May 3, 1913	
H. R. McCauley	Rodman "A"	May 16, 1913	
A. J. Kutzleb	Rodman "A"	June 16, 1913	

TABLE No. 1—*Continued.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
H. Reid Treiber	Rodman "A"	Feb. 5, 1912	Promoted from Rodman "B" Aug. 1, 1913.
Charles T. Wanzer	Rodman "A"	June 27, 1913	
Alan F. Bristor	Rodman "B"	Oct. 10, 1912	
Chauncey Brooks	Rodman "B"	April 24, 1912	
M. E. Gerlach	Rodman "B"	May 28, 1912	
C. W. Hook	Rodman "B"	April 4, 1912	
James H. McKay	Rodman "B"	Mar. 14, 1912	Resigned July 1, 1913.
William T. Snyder	Rodman "B"	Mar. 28, 1912	Resigned Jan. 1, 1913.
Guy C. Sykes	Rodman "B"	May 22, 1912	
E. S. Trine	Rodman "B"	Nov. 14, 1912	
Otis G. Wilbur	Rodman "B"	Nov. 18, 1912	Resigned April 30, 1913.
Oscar R. Willey	Rodman "B"	May 27, 1912	Dropped June 15, 1913.
Howard Wilds	Rodman "B"	June 20, 1913	
M. E. Davis	Rodman "B"	July 7, 1913	Resigned Dec. 31, 1913.
C. W. Miller	Rodman "B"	July 10, 1913	
F. B. Beacham	Rodman "B"	July 7, 1913	
W. O. Towson	Rodman "B"	Sept. 17, 1913	
Leo Blankman	Rodman "B"	July 28, 1913	
Robert W. Downes	Rodman "B"	Sept. 11, 1913	
George E. Harris, Jr.	Rodman "B"	April 17, 1913	
Rollins Alexander	Rodman "B"	July 24, 1913	
C. E. Reynolds	Rodman "B"	Sept. 9, 1913	
George J. Armeling	Engineer of Tests	Aug. 8, 1907	Transferred from Chemist Jan. 1, 1913.
W. H. Streeter	Chemist and Bact.	Jan. 2, 1913	
T. R. Schoonmaker	Asst. Chemist	June 26, 1912	Transferred from Rodman "A" April 1, 1913

TABLE No. 1—*Concluded.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
M. H. Melvin	Cement Tester	June 27, 1912	Transferred from Rodman "A" Jan. 1, 1913.
Norman Byrd	Asst. Cement Tester	Feb. 1, 1913	
C. F. Kraeter	Cement Sampler	Sept. 20, 1906	Transferred from Rodman "A" Jan. 1, 1913.
Robert Piggott	Asst. Cement Sampler	Mar. 18, 1912	Transferred from Rodman "B" Jan. 1, 1913.
Charles H. Brooks	Asst. Cement Sampler	Nov. 16, 1907	Transferred from Rodman "B" Jan. 1, 1913.
R. N. Brooks	Asst. Cement Sampler	May 1, 1913	
Urban Preller	Laboratory Assistant	June 1, 1912	
H. N. O'Brien	Supt. Day Labor	Oct. 11, 1907	
Cloyd S. Weaver	Stenographer "A"	Jan. 2, 1912	Resigned April 1, 1913.
S. Robert Martin	Stenographer "A"	Feb. 19, 1912	Promoted from Stenog. "B" July 15, 1913.
Robert F. Windfohr	Stenographer "A"	Oct. 28, 1912	Promoted from Stenog. "B" July 15, 1913.
J. L. Pennington	Stenographer "B"	July 23, 1909	Resigned Oct. 1, 1913.
George F. Bayliss	Stenographer "B"	Feb. 5, 1912	Resigned Mar. 23, 1913.
Edison M. Hughes	Stenographer "B"	Feb. 1, 1912	
George W. Schiminger	Stenographer "B"	Oct. 1, 1913	
G. L. Hughes	Stenographer "B"	Sept. 5, 1913	
J. E. Freeman	Stenographer "B"	Sept. 8, 1913	
J. E. Derenberger	Stenographer "B"	April 7, 1913	
C. Milton Stapf	Stenographer "B"	Aug. 11, 1913	Resigned Sept. 1, 1913.
M. H. Frank	File Clerk	Jan. 25, 1912	
William C. Higgins	Clerk	Oct. 3, 1912	
M. J. Kerr	Clerk	Feb. 3, 1913	
Kenneth M. Burns	Clerk	May 16, 1913	

TABLE No. 2.

STATEMENT OF CONTRACTS LET PRIOR TO 1913.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PROPORTION OF WORK COMPLETED DECEMBER 31, 1913.
Wash Borings No. 1	July 2, 1906.	B. F. Smith & Bro.	Completed July 28, 1906.
Testing Plant	Oct. 17, 1906.	Malcolm W. Hill Co.	Completed July 1, 1907.
Laboratory	Oct. 18, 1906.	Wm. Kirkpatrick	Completed Feb. 1, 1907.
Storm Water No. 1	Oct. 18, 1906.	M. A. Talbott Co.	Completed April 14, 1908.
Sanitary Sewers—Walbrook	Oct. 29, 1906.	M. A. Talbott Co.	Completed June 27, 1907.
Outfall Sewer, Section No. 1	Dec. 7, 1906.	M. A. Talbott Co.	Completed August 1, 1909.
Outfall Sewer, Section No. 2	Dec. 7, 1906.	M. A. Talbott Co.	Completed August 6, 1908.
Sewage Pumping Plant Mach'y.	Dec. 12, 1906.	Bethlehem Steel Co.	Completed Feb. 18, 1913.
West Low Level Interceptor, Section No. 1	May 1, 1907.	Metropolitan Confr. Co.	Completed March 26, 1908.
West Low Level Interceptor, Section No. 2	May 1, 1907.	Metropolitan Contr. Co.	Completed March 26, 1908.
Outfall Sewer, Section No. 3	May 4, 1907.	J. Connelly Const. Co.	Completed June 7, 1909.
Outfall Sewer, Section No. 7	May 4, 1907.	J. Connelly Const. Co.	Completed Dec. 19, 1908.
Outfall Sewer, Section No. 8	May 4, 1907.	J. Connelly Const. Co.	Completed Nov. 1, 1908.
Outfall Sewer, Section No. 9	May 4, 1907.	A. F. Helm	Completed Oct. 13, 1908.
Outfall Sewer, Section No. 6	May 28, 1907.	David Peoples	Completed Oct. 16, 1908.
Storm-Water No. 2	May 28, 1907.	David Peoples	Completed May 11, 1909.
Storm-Water No. 3	May 28, 1907.	David Peoples	Completed May 15, 1909.
High Level Interceptor, Section No. 1	May 29, 1907.	M. A. Talbott Co.	Completed Nov. 5, 1908.
High Level Interceptor, Section No. 2	May 29, 1907.	M. A. Talbott Co.	Completed May 1, 1909.

TABLE No. 2—*Continued.*

STATEMENT OF CONTRACTS LET PRIOR TO 1913.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PROPORTION OF WORK COMPLETED DECEMBER 31, 1913.
Outfall Sewer, Section No. 4..	May 29, 1907.	M. A. Talbott Co......	Completed March 17, 1909.
Outfall Sewer, Section No. 5..	May 29, 1907.	M. A. Talbott Co......	Completed August 1, 1909.
Outfall Sewer, Section No. 10.	June 10, 1907.	J. Connelly Const. Co....	Completed Nov. 1, 1908.
	NOTE.—This contract was first awarded to J. Erwin Hillpot, but he was unable to furnish satisfactory bond and the contract was reawarded to the J. Connelly Construction Company, the next lowest bidder.		
Sewage Disposal Plant, Clearing and Grubbing Disposal Area	July 8, 1907.	Lane Bros. Co. & Jones..	Completed Sept. 1, 1909.
	NOTE.—This contract was awarded on April 24 to J. Erwin Hillpot, but he was unable to furnish a satisfactory bond and the work was readvertised.		
Digging Test Well on site of Sewage Pumping Station....	July 29, 1907.	Metropolitan Contr. Co.	Completed August 27, 1907.

TABLE No. 2—*Continued.*

STATEMENT OF CONTRACTS LET PRIOR TO 1913.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PROPORTION OF WORK COMPLETED DECEMBER 31, 1913.
West Low Level Interceptor, Section No. 3	Feb. 28, 1908.	Metropolitan Contr. Co.	Completed Oct. 30, 1908.
East Low Level Interceptor, Section No. 1	May 8, 1908.	T. J. O'Connell	Completed May 15, 1909.
East Low Level Interceptor, Section No. 2	May 8, 1908.	T. J. O'Connell	Completed May 15, 1909.
Grading Manderson lot	May 8, 1908.	Gustavus Keckel	Completed June 29, 1908.
Sewage Pumping Station, Superstructure	May 9, 1908.	Noel Construction Co.	
Sewage Pumping Station, Substructure	May 9, 1908.	Noel Construction Co.	Completed August 1, 1911.
Storm Water Contract No. 4	June 17, 1908.	Reilly & Riddle	Completed March 16, 1909.
Roadway, Willis avenue	Aug. 7, 1908.	L. B. McCabe	Completed Nov. 30, 1908.
Storm Water Contract No. 5	Sept. 17, 1908.	David Peoples	Completed Jan. 23, 1909.
Roadways on Baltimore Brick Company's property	Sept. 28, 1908.	Thos. Mullan	Completed Dec. 7, 1908.
West Low Level Interceptor, Section No. 4	Oct. 28, 1908.	Metropolitan Contr. Co.	Completed July 10, 1909.
Force Main	Nov. 2, 1908.	**Warren F. Brenizer Co.**	Completed Oct. 12, 1909.
Force Main Sewer	Nov. 4, 1908.	**Ryan & Reilly**	Completed Sept. 30, 1900.
Sewage Disposal Plant	Nov. 4, 1908.	New York Continental Jewell Filtration Co.	Completed Dec. 23, 1910.
Storm Water Contract No. 6	Dec. 31, 1908.	Booth & Flinn	Completed Jan. 28, 1910.

TABLE No. 2—*Continued.*

STATEMENT OF CONTRACTS LET PRIOR TO 1913.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PROPORTION OF WORK COMPLETED DECEMBER 31, 1913.
Filter Stone for Sewage Disposal Plant................	Dec. 31, 1908.	Fisher & Carozza.......	Completed June 1, 1911.
Sanitary Contract No. 35, Lateral Sewers, District No. 26.	Mar. 6, 1909.	T. Wallace Reilly.......	Completed Oct. 7, 1909.
Sanitary Contract No. 37, Sewage Disposal Plant, Water Tanks and Tower..........	Feb. 19, 1909.	Horace E. Horton (Chicago Bridge and Iron Works)..............	Completed Sept. 1, 1909.
Sanitary Contract No. 38, Lateral Sewers, District No. 28.	April 10, 1909.	Ryan & Reilly..........	Completed Nov. 10, 1909.
Sanitary Contract No. 39, Lateral Sewers, District No. 30.	April 15, 1909.	James Ferry & Sons....	Completed Sept. 25, 1909.
Sanitary Contract No. 40, Forest Park Sewage Disposal Works...............	Sept. 15, 1909.	Lane Bros. Co. & Jones.	Completed Oct. 25, 1910.
Sanitary Contract No. 41, Trunk Sewers, District No. 48	Sept. 10, 1909.	T. Wallace Reilly......	Contract abandoned June 15, 1910. 72% of work completed.
Sanitary Contract No. 42, Jones Falls Interceptor, Section No. 1	Sept. 22, 1909.	M. A. Talbott Co.....	Completed Oct. 15, 1910.
Sanitary Contract No. 43, Lateral Sewers, District No. 29.	Sept. 11, 1909.	Wm. McCarthy & Co..	Completed April 25, 1910.

TABLE No. 2—*Continued*

STATEMENT OF CONTRACTS LET PRIOR TO 1913.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PROPORTION OF WORK COMPLETED DECEMBER 31, 1913.
Sanitary Contract No. 44, Lateral Sewers, District No. 21.	Dec. 18, 1909.	David Peoples.........	Completed Aug. 15, 1910.
Sanitary Contract No. 45, Lateral Sewers, District No. 27.	Dec. 18, 1909.	David Peoples.........	Completed Aug. 8, 1910.
Storm Water Contract No. 7..	June 2, 1909.	Wm. McCarthy & Co..	Completed Dec. 31, 1909.
Storm Water Contract No. 8..	Sept. 11, 1909.	M. O'Herron & Co....	Completed Dec. 31, 1909.
Sanitary Contract No. 46, Power-house, Pump House and Land Conduits, Sewage Disposal Plant.............	Feb. 21, 1910.	Ryan & Reilly.........	Completed April 1, 1911.
Sanitary Contract No. 47, Underwater Discharge Conduits, Sewage Disposal Plant.	Mar. 10, 1910.	B. F. Sweeten & Son.	Completed Dec. 2, 1911.
Sanitary Contract No. 48, Lateral Sewers, District 19-B..	Feb. 28, 1910.	Irwin Brothers.........	Completed Oct. 15, 1910.
Sanitary Contract No. 49, Lateral Sewers, District No. 35..	Feb. 28, 1910.	Irwin Brothers..........	Completed Aug. 12, 1910.
Sanitary Contract No. 50, Jones Falls Interceptor, Sec. No. 2.	May 20, 1910.	United Engineering & Construction Co.....	Completed May 18, 1911.
Sanitary Contract No. 51, Electrical and Mechanical Equipment, Sewage Disposal Plant.	May 21, 1910.	McCay Engineering Co	Completed Feb. 20, 1912.

TABLE No. 2—*Continued.*

STATEMENT OF CONTRACTS LET PRIOR TO 1913.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PROPORTION OF WORK COMPLETED DECEMBER 31, 1913.
Sanitary Contract No. 52, Lateral Sewers, District No. 19-A, etc.	June 9, 1910.	Wm. McCarthy & Co.	Completed June 16, 1911.
Sanitary Contract No. 53, Lateral Sewers, District No. 25, etc.	June 23, 1910.	D. V. Ault & Co.	Completed Jan. 16, 1911.
Sanitary Contract No. 54, Trunk Sewers, District No. 48*	July 28, 1910.	W. H. & C. F. Thompson	Completed Mar. 10, 1911.
Sanitary Contract No. 55, Lateral Sewers, District No. 14	Sept. 16, 1910.	B. F. Sweeten & Son	Completed April 12, 1911.
Sanitary Contract No. 56, Coal and Ash Conveying Plant, Sewage Pumping Station	Sept. 20, 1910.	Dietz Engineering Co.	Completed March 1, 1913.
Sanitary Contract No. 57, Lateral Sewers, District No. 34-A	Nov. 10, 1910.	Whiting-Middleton Construction Co.	Completed July 14, 1911.
Sanitary Contract No. 58, McMechen Street Interceptor	Nov. 23, 1910.	McCay Engineering Co.	Completed April 3, 1911.
Sanitary Contract No. 59, Electric Wiring, Sewage Pumping Station	Dec. 16, 1910.	Central Electric Co.	Completed June 26, 1912.
Storm Water Contract No. 9	Mar. 26, 1910.	David Peoples	Completed June 27, 1911.
Storm Water Contract No. 10.	June 29, 1910.	George F. Beavin	Completed Dec. 24, 1910.

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*Completion of work originally included in Contract No. 41.

TABLE No. 2—*Continued.*

STATEMENT OF CONTRACTS LET PRIOR TO 1913.

Contract.	Date of Contract.	Name of Contractor.	Proportion of Work Completed December 31, 1913.
Sanitary Contract No. 60, Sewage Disposal Plant Laboratory Building..............	June 3, 1911.	D. M. Andrew Co.....	Completed April 1, 1912.
Sanitary Contract No. 61, Lateral Sewers, District No. 40-C.........................	Jan. 10, 1911.	B. F. Sweeten & Son...	Completed Nov. 1, 1911.
Sanitary Contract No. 62, Pratt Street Trunk Sewer.........	Mar. 9, 1911.	McCay Engineering Co..	Completed Dec. 18, 1911.
Sanitary Contract No. 63, Lateral Sewers, District No. 15..	Mar. 11, 1911.	Wm. McCarthy & Co...	Completed Nov. 2, 1911.
Sanitary Contract No. 64, Sewage Pumping Station, Waterpiping and Steam Heating...	Mar. 6, 1911.	Wanner Steam and Hot Water Heating Co....	Completed Mar. 31, 1912.
Sanitary Contract No. 65, Sewage Disposal Plant, Sewage Screens	....	....	Bids rejected.
Sanitary Contract No. 66, Lateral Sewers, District No. 36-A..........................	June 15, 1911.	B. F. Sweeten & Son...	Completed Mar. 1, 1912.
Sanitary Contract No. 67, Sewage Pumping Station, Junction Sewer	June 8, 1911.	Martin J. Beach........	Completed Dec. 30, 1911.
Sanitary Contract No. 68, Sewage Disposal Plant, Nozzles for Sprinkling Filters.......	Aug. 21, 1911.	Merritt & Co..........	Completed Jan. 10, 1912.

TABLE No. 2—*Continued.*

STATEMENT OF CONTRACTS LET PRIOR TO 1913.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PROPORTION OF WORK COMPLETED DECEMBER 31, 1913.
Sanitary Contract No. 69, Fixed Screens at Sewage Disposal Works and Sewage Pumping Station....................	July 27, 1911.	H. S. Roberts..........	Completed Feb. 20, 1912.
Sanitary Contract No. 70, Sewage Disposal Plant, Pier over Discharge Pipes............	....	....	Withdrawn.
Sanitary Contract No. 71, Lateral Sewer in Alley West of Park Heights Avenue, north of Fifth Avenue............	Aug. 9, 1911.	G. R. Abbott...........	Completed Sept. 30, 1911.
Sanitary Contract No. 72, Sewage Pumping Plant, Discharge Piping and Valves...	Aug. 17, 1911.	B. F. Sweeten & Son...	Completed Nov. 1, 1912.
Sanitary Contract No. 73, Sewage Pumping Station, Electric Generators and Switchboards.....................	Sept. 18, 1911.	Thos. C. Basshor Co....	90 per cent.
Sanitary Contract No. 74, Lateral Sewers, District No. 20-B..........................	Sept. 22, 1911.	B. F. Sweeten & Son...	Completed Jan. 4, 1913.
Sanitary Contract No. 75, High Level Interceptor, Section No. 4..........................	Sept. 25, 1911.	W. H. & C. F. Thompson..................	Completed Nov. 18, 1912.

TABLE No. 2—*Continued.*

STATEMENT OF CONTRACTS LET PRIOR TO 1913.

Contract.	Date of Contract.	Name of Contractor.	Proportion of Work Completed December 31, 1913.
Sanitary Contract No. 76, Lateral Sewer in Alley east of Park Heights Avenue, between Third and Fifth Avenues	Sept. 25, 1911.	W. H. & C. F. Thompson	Completed Nov. 3, 1911.
Sanitary Contract No. 77, Sewage Disposal Plant, Revolving Screens	Nov. 10, 1911.	D'Olier Engineering Co.	Completed April 30, 1912.
Storm Water Contract No. 11.	Jan. 13, 1911.	Wm. McCarthy & Co.	Completed May 4, 1911.
Storm Water Contract No. 12.	Mar. 30, 1911.	C. B. Clark & Co.	Completed April 10, 1912.
Storm Water Contract No. 13.	Sept. 22, 1911.	Ryan & Reilly	Completed Sept. 2, 1912.
Storm Water Contract No. 14, Jones Falls Conduits, Section No. 1	July 10, 1911.	M. M. Elkan	Completed July 1, 1913.
Storm Water Contract No. 15.	Sept. 9, 1911.	Martin J. Beach	Completed Nov. 2, 1911.
Storm Water Contract No. 16, Jones Falls Conduits, Section No. 2	Nov. 6, 1911.	Fisher & Carozza	Completed December 6, 1913.
Sanitary Contract No. 78, Lateral Sewers, District No. 20-A	Jan. 3, 1912.	Wm. McCarthy & Co.	Completed Nov. 19, 1912.
Sanitary Contract No. 79, Sanitary Sewers in Frederick Road	Feb. 16, 1912.	Martin J. Beach	Completed Aug. 11, 1912.

TABLE No. 2—*Continued.*

STATEMENT OF CONTRACTS LET PRIOR TO 1913.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PORTION OF WORK COMPLETED DECEMBER 31, 1913.
Sanitary Contract No. 80, Lateral Sewers at Bay View Asylum	Feb. 2, 1912.	Bond & Bates..........	Completed Sept. 10, 1912.
Sanitary Contract No. 81, High Level Interceptor, Section No. 5.....................	Feb. 23, 1912.	Ryan & Reilly..........	Completed Feb. 1, 1913.
Sanitary Contract No. 82, House Connections Across Footways in Districts Nos. 25, 27, 28, 34-A and 35......	Jan. 3, 1912.	Wm. McCarthy & Co...	Completed July 31, 1912.
Sanitary Contract No. 83, Nozzles for Sprinkling Beds Nos. 3 and 4...............	Feb. 3, 1912.	Pacific Flush Tank Co..	Completed April 20, 1912.
Sanitary Contract No. 84, Lateral Sewers in Light and Gay Streets	Feb. 23, 1912.	Ryan & Reilly..........	Completed April 30, 1912.
Sanitary Contract No. 85, House Connections, District No. 14.....................	Feb. 20, 1912.	Gallagher, Boyle & Muller	Completed July 3, 1912.
Sanitary Contract No. 86, Lateral Sewers in District No. 17.........................	Apr. 15, 1912.	B. F. Sweeten & Son...	Completed Feb. 8, 1913.

TABLE No. 2—*Continued.*

STATEMENT OF CONTRACTS LET PRIOR TO 1913.

Contract.	Date of Contract.	Name of Contractor.	Portion of Work Completed December 31, 1913.
Sanitary Contract No. 87, Lateral Sewers in District No. 18	May 1, 1912.	B. F. Sweeten & Son	Completed July 12, 1913.
Sanitary Contract No. 88, Lateral Sewers in District No. 40-B	May 2, 1912.	Jas. Ferry & Sons	Completed Feb. 1, 1913.
Sanitary Contract No. 89, High Level Interceptor, Section No. 3	May 31, 1912.	H. C. Brooks & Co.	Completed April 18, 1913.
Sanitary Contract No. 90, Miscellaneous Lateral Sewers	June 7, 1912.	Ryan & Reilly	Completed Dec. 2, 1912.
Sanitary Contract No. 91, Macadam Roadway at Back River	July 12, 1912.	Carozza & Lavezza	Completed Oct. 22, 1912.
Sanitary Contract No. 92, House Connections Across Footways in District No. 15.	June 21, 1912.	Gallagher, Boyle & Muller	Completed Oct. 15, 1912.
Sanitary Contract No. 93, House Connections Across Footways in Districts Nos. 29 and 30	July 16, 1912.	Wm. McCarthy & Co.	Completed Jan. 2, 1913.
Sanitary Contract No. 94, Miscellaneous Lateral Sewers No. 2	Aug. 17, 1912.	Gallagher, Boyle & Bryan	Completed Feb. 15, 1913.

TABLE No. 2—*Continued.*

STATEMENT OF CONTRACTS LET PRIOR TO 1913.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PORTION OF WORK COMPLETED DECEMBER 31, 1913.
Sanitary Contract No. 95, High Level Interceptor, Section No. 6	Aug. 6, 1912.	Ryan & Reilly	Completed May 1, 1913.
Sanitary Contract No. 96, Digging Ditches at Back River	....	....	Bids rejected.
Sanitary Contract No. 97, Miscellaneous Lateral Sewers No. 3	Sept. 7, 1912.	Gallagher, Boyle & Bryan	Completed Feb. 22, 1913.
Sanitary Contract No. 98, House Connections Across Footways in District No. 26	Sept. 27, 1912.	Jas. Ferry & Sons	Completed Feb. 1, 1913.
Sanitary Contract No. 99, House Connections Across Footways in District No. 19-B	Sept. 27, 1912.	Wm. McCarthy & Co.	Completed Jan. 15, 1913.
Sanitary Contract No. 100, Sprinkling Filters, Disposal Plant	Oct. 10, 1912.	Lane Bros. Co.	94 per cent.
Sanitary Contract No. 101, Broken Stone, Sewage Disposal Plant	Oct. 3, 1912.	Standard Lime & Stone Co.	26 per cent.
Sanitary Contract No. 102, High Level Interceptor, Section No. 7	Oct. 16, 1912.	C. B. Clark & Co.	Completed Sept. 29, 1913.

TABLE No. 2—*Concluded.*

STATEMENT OF CONTRACTS LET PRIOR TO 1913.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PORTION OF WORK COMPLETED DECEMBER 31, 1913.
Sanitary Contract No. 103, Locust Point Trunk Sewer, Section No. 1..............	Oct. 16, 1912.	Ryan & Reilly.........	Completed May 5, 1913.
Sanitary Contract No. 104, Lateral Sewers, District No. 40-A	Nov. 6, 1912.	Wm. McCarthy & Co...	Completed June 2, 1913.
Sanitary Contract No. 105, House Connections Across Footways in Districts Nos. 36-A and 40-C.............	Nov. 30, 1912.	Carozza & Lavezza.....	Completed Mar. 10, 1913.
Sanitary Contract No. 106, House Connections in Districts No. 19-A and 21-A....	Dec. 30, 1912.	Wm. McCarthy & Co...	Completed May 16, 1913.
Storm-water Contract No. 17.	Jan. 2, 1912.	N. A. Middleton & Co..	Completed July 6, 1912.
Storm-water Contract No. 18.	Jan. 3, 1912.	Wm. McCarthy & Co...	Completed Sept. 29, 1912.
Storm-water Contract No. 19.	Mar. 18, 1912.	B. F. Sweeten & Son....	Completed Jan. 6, 1913.
Storm-water Contract No. 20.	Apr. 25, 1912.	Ryan & Reilly.........	Completed Nov. 1, 1912.
Storm-water Contract No. 21.	July 13, 1912.	C. B. Clark & Co......	Completed April 2, 1913.
Storm-water Contract No. 22.	Oct. 8, 1912.	B. F Sweeten & Son....	Completed Dec. 15, 1913.
Storm-water Contract No. 23.	Oct. 25, 1912.	Wm. McCarthy & Co...	Completed April 24, 1913.
Storm-water Contract No. 24.	Dec. 27, 1912.	B. F. Sweeten & Son....	Completed Dec. 15, 1913.
Storm-water Contract No. 25..	Dec. 31, 1912.	Jas. Ferry & Sons......	Completed Dec. 17, 1913.

STATEMENT OF CONTRACTS LET DURING THE YEAR 1913, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1913
Sanitary Contract No. 107, Lateral Sewers, District No. 8.	Frank Bruno & Co.	Feb. 18, 1913	31,450 lin. ft. 8″ sewer.	$117,873.52	$124,886.70	Completed Dec. 31, 1913.
			2,805 lin. ft. 10″ sewer.			
			2,230 lin. ft. 12″ sewer.			
			690 lin. ft. 15″ sewer.			
			315 lin. ft. 18″ sewer.			
			660 lin. ft. 22″ sewer.			
			810 lin. ft. 24″ sewer.			
			350 lin. ft. 36″ sewer.			
			135 cu. yds. excavation below sub-grade.			
			70 cu. yds. gravel refill below sub-grade.			
			195 cu. yds. concrete masonry.			
			4,000 lin. ft. 4″ and 6″ underdrain.			
			366 M. ft. B. M. sheeting, shoring, etc.			
			2,128 lin. ft. standard manholes.			
			242 manhole frames.			
			950 manhole steps.			
			48 drop-connections.			
			33,800 lin. ft. excavation for house-connections.			
			35,100 lin. ft. vitrified and cast-iron pipe house-connections.			
			2,613 branches.			
			350 lin. ft. vitrified standpipe.			
			24 lamphole frames and covers.			
			1,650 lin. ft. W. I. water supply pipe to manholes.			
			5,050 sq. ft. granolithic pavement relaid.			
			16,750 sq. ft. vitrified block and other pavement relaid.			

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1913, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.		Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1913.
Sanitary Contract No. 108, Miscellaneous Lateral Sewers No. 4.	W. H. Thompson Construction Company.	May 16, 1913	4,425	lin. ft. 8″ sewer.	$17,006.20	$19,080.45	Completed Nov. 14, 1913.
			2,485	lin. ft. 10″ sewer.			
			40	cu. yds. excavation below sub-grade.			
			530	cu. yds. rock excavation.			
			25	cu. yds. concrete masonry.			
			700	lin. ft. 4″ and 6″ underdrain.			
			72	M. ft. B. M. sheeting, shoring, etc.			
			320	lin. ft. manholes.			
			37	manhole frames and covers.			
			260	manhole steps.			
			1,850	lin. ft. excavation for house-connections.			
			2,100	lin. ft. vitrified and cast-iron pipe house-connections.			
			250	lin. ft. W. I. water supply pipe to manholes.			
			225	sq. ft. granolithic pavement relaid.			
			535	lin. ft. vitrified block and other pavement relaid.			

STATEMENT OF CONTRACTS LET DURING THE YEAR 1913, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1913.
Sanitary Contract No. 109, Latera Sewers, District No. 41.	Carozza, Lavezza & Carozza.	Mar. 11, 1913	26,100 lin. ft. 8″ sewer. 390 lin. ft. 10″ sewer. 1,190 lin. ft. 12″ sewer. 490 lin. ft. 15″ sewer. 210 lin. ft. 22″ sewer. 880 lin. ft. 24″ sewer. 100 cu. yds. excavation below sub-grade. 75 yds. rock excavation. 230 cu. yds. concrete masonry. 3,500 lin. ft. 4″ and 6″ underdrain. 366 M. ft. B. M. sheeting, shoring, etc. 1,600 lin. ft. manholes. 168 manhole frames and covers. 672 manhole steps. 21,600 lin. ft. excavation for house-connections. 25,705 lin ft. vitrified and cast-iron pipe house-connections. 1,329 branches. 400 lin. ft. vitrified standpipes. 1,000 lin. ft. W. I. water supply pipe to manholes. 2,975 sq. ft. granolithic pavement relaid. 9,850 lin. ft. vitrified block and other pavement relaid.	$92,697.65	$94,242.00	Completed Dec. 1, 1913.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1913, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1913.
Sanitary Contract No. 110, Lateral Sewers, District No. 16-B.	McCarthy & O'Herron.	May 1, 1913	5,175 lin. ft. 8″ sewer in trench. 3,800 lin. ft. 10″ sewer in tunnel. 140 lin. ft. 12″ sewer in tunnel. 390 lin. ft. 15″ sewer in tunnel. 225 lin. ft. 18″ sewer in tunnel. 50 cu. yds. rock excavation. 310 cu. yds. concrete masonry. 7,300 lin. ft. 4″ and 6″ underdrain. 1,080 M. ft. B. M. sheeting, shoring, etc. 1,480 lin. ft. manhole masonry. 118 manhole frames and covers. 750 manhole steps. 14,000 lin ft. excavation for house-connections. 15,110 lin. ft. vitrified and cast-iron pipe house-connections. 685 branches. 625 lin. ft. W. I. water supply pipe to manholes. 2,450 sq. ft. granolithic pavement relaid. 4,050 lin. ft. vitrified block and other pavement relaid.	$146,833.70	$147,470.90	99 per cent.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1913, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1913.
Sanitary Contract No. 111, Lateral Sewers District No. 16-A.	Middleton-Thompson Company.	June 3, 1913	2,585 lin. ft. 10″ sewer in tunnel. 11,000 lin. ft. 10″ sewer in trench. 1,155 lin. ft. 12″ sewer in tunnel. 635 lin. ft. 12″ sewer in trench. 1,000 lin. ft. 15″ sewer in trench. 755 lin. ft. 18″ sewer in tunnel. 160 lin. ft. 18″ sewer in trench. 305 lin. ft. 20″ sewer in trench. 420 lin. ft. 22″ sewer in tunnel. 340 lin. ft. 22″ sewer in trench. 50 cu. yds. rock excavation. 310 cu. yds. concrete masonry. 7,300 lin. ft. underdrain, 4″ to 6″. 915 M. ft. B. M. sheeting, shoring, etc. 1,400 lin. ft. manholes. 116 manhole frames and covers. 750 manhole steps. 13,900 lin. ft. excavation for house-connections. 14,530 lin. ft. vitrified and cast-iron pipe house-connections. 660 branches. 600 lin. ft. vitrified standpipe. 2,200 sq. ft. granolithic pavement relaid. 4,700 lin. ft. vitrified and other pavement relaid.	$157,503.40	$164,826.25	77 per cent.
Sanitary Contract No. 113, Paving, Around Sewage Pumping Station	John Danini.	Aug. 8, 1913	642 lin. ft. concrete coping. 602 lin. ft. armored concrete curb. 35 cu. yds. concrete in retaining walls. 6,865 sq. ft. granolithic pavement.	$1,998.11	$2,090.31	Completed Oct. 7, 1913.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1913, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1913.
Sanitary Contract No. 114, High Level Interceptor, Section No. 8.	C. B. Clark & Co.	June 4, 1913	5,300 cu. yds. excavation in trench. 1,425 lin. ft. excavation in tunnel. 375 cu. yds. rock excavation in trench. 2,000 cu. yds. rock excavation in tunnel. 260 cu. yds. brick masonry. 1,335 cu. yds. concrete masonry. 2,000 lbs. twisted steel for reinforcement. 500 cu. yds. embankment. 335 M. ft. B. M. sheeting, shoring, etc. 400 lin. ft. excavation for house-connections. 510 lin. ft. vitrified and cast-iron pipe house-connections. 50 sq. ft. granolithic pavement relaid. 400 lin. ft. vitrified and other pavement relaid. 3,000 lin. ft. 6″ and 8″ underdrain.	$100,162.40	$107,963.05	85 per cent.
Sanitary Contract No. 115, House Connections Across Footways, District No. 20-B.	Carozza, Lavezza & Carozza.	June 2, 1913	29,610 lin. ft. excavation for house-connections. 30,785 lin. ft. vitrified and cast-iron pipe house-connections. 420 branches. 9 M. ft. B. M. sheeting, shoring, etc. 8,300 sq. ft. granolithic pavement relaid. 27,560 lin. ft. vitrified and other pavement	$23,870.30	$24,712.70	Completed Oct. 22, 1913.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1913, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1913.
Sanitary Contract No. 116, Lateral Sewers, District No. 22-B.	Gallagher, Boyle & Bryan.	June 19, 1913	44,250 lin. ft. 8″ sewer. 2,550 lin. ft. 10″ sewer. 2,600 lin. ft. 12″ sewer. 1,100 lin. ft. 15″ sewer. 75 cu. yds. rock excavation. 580 cu. yds. concrete masonry. 10,000 lin. ft. 4″ and 6″ underdrain. 930 M. ft. B. M. sheeting, shoring, etc. 2,650 lin. ft. manholes. 280 manhole frames and covers. 1,400 manhole steps. 53,325 lin. ft. excavation for house-connections. 53,865 lin. ft. vitrified and cast-iron pipe house-connections. 3,510 branches. 2,000 lin. ft. W. I. water supply pipe to manholes. 8,000 sq. ft. granolithic pavement relaid. 20,000 lin. ft. vitrified and other pavement relaid.	$190,001.80	$197,985.05	Completed Dec. 10, 1913.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1913, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1913.
Sanitary Contract No. 117, Miscellaneous Lateral Sewers.	W. H. Thompson Construction Company.	July 18, 1913	12,000 lin ft. 8″ sewer. 2,110 lin. ft. 10″ sewer. 20 cu. yds. rock excavation. 60 cu. yds. concrete masonry. 3,500 lin. ft. 4″ to 6″ underdrain. 233 M. ft. B. M. sheeting, shoring, etc. 1,100 lin. ft. manholes. 110 manhole covers. 550 manhole steps. 9,700 lin. ft. excavation for house-connections. 11,475 lin. ft. vitrified and cast-iron pipe house-connections. 740 branches. 500 lin. ft. W. I. water supply pipe to manholes. 4,500 sq. ft. granolithic pavement relaid. 10,000 lin ft. vitrified and other pavement relaid.	$51,183.75	$51,605.25	99 per cent.

STATEMENT OF CONTRACTS LET DURING THE YEAR 1913, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1913.
Sanitary Contract No. 118, Lateral Sewers, Districts Nos. 21-A and 22-A.	McCarthy & O'Herron.	Sept. 16, 1913	6,600 lin. ft. 8" sewer. 3,500 lin. ft. 10" sewer. 1,400 lin. ft. 12" sewer. 1,150 lin. ft. 16" sewer. 25 cu. yds. rock excavation. 180 cu. yds. concrete masonry. 6,000 lin. ft. 4" to 6" underdrain. 420 M. ft. B. M. Sheeting, shoring, etc. 600 lin. ft. manholes. 60 manhole frames and covers. 350 manhole steps. 12,200 lin. ft. excavation for house-connections. 13,750 lin. ft. vitrified and cast-iron pipe house-connections. 700 branches. 500 lin. ft. W. I. water supply pipe to manholes. 2,500 sq. ft. granolithic pavement relaid. 6,000 lin. ft. vitrified and other pavement relaid. 3 flush tanks.	$76,979.70	$84,748.50	99 per cent.

STATEMENT OF CONTRACTS LET DURING THE YEAR 1913, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1913.
Sanitary Contract No. 119, Lateral Sewers, District No. 44-A.	Gallagher, Boyle & Bryan.	Dec. 2, 1913	45,000 lin. ft. 8″ sewer. 2,525 lin. ft. 10″ sewer. 850 lin. ft. 12″ sewer. 1,225 lin. ft. 18″ sewer. 1,525 lin. ft. 20″ sewer. 775 lin. ft. 22″ sewer. 550 lin. ft. 24″ sewer. 25 cu. yds. rock excavation. 600 cu. yds. concrete masonry. 11,000 lin. ft. 4″ and 6″ underdrain. 840 M. ft. B. M. sheeting, shoring, etc. 2,900 lin. ft. manholes. 335 manhole frames and covers. 1,675 manhole steps. 34,300 lin. ft. excavation for house-connections. 34,975 lin. ft. vitrified and cast-iron pipe house-connections. 3,230 branches. 2,300 lin. ft. W. I. water supply pipe to manholes. 6,000 sq. ft. granolithic pavement relaid. 13,500 lin. ft. vitrified and other pavement relaid.	$176,154.75	$180,017.90	10 per cent.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1913, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1913.
Sanitary Contract No. 120, Locust Point Trunk Sewer, Section No. 2.	Whiting-Turner Construction Co.	Oct. 16, 1913	3,500 lin. ft. 30″ sewer. 60 cu. yds. concrete masonry. 3,500 lin. ft. 4″ to 6″ underdrain. 415 M. ft. B. M. sheeting, shoring, etc. 1,500 lin. ft. piles. 220 lin. ft. manholes. 13 manhole frames and covers. 90 manhole steps. 1,650 lin. ft. excavation for house-connections. 1,790 lin. ft. vitrified and cast-iron pipe house-connections. 100 sq. ft. granolithic pavement relaid. 100 lin. ft. vitrified and other pavement relaid.	$55,947.50	$57,582.50	2 per cent.

STATEMENT OF CONTRACTS LET DURING THE YEAR 1913, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID	PROPORTION OF WORK COMPLETED DEC. 31, 1913.
Sanitary Contract No. 121, Miscellaneous Lateral Sewers No. 6.	Whiting-Turner Construction Co.	Oct 8, 1913	8,925 lin. ft. 8″ sewer. 3,900 lin. ft. 10″ sewer. 1,550 lin. ft. 12″ sewer. 510 lin. ft. 15″ sewer. 20 cu. yds. rock excavation. 60 cu. yds. concrete masonry. 4,000 lin. ft. 4″ to 6″ underdrain. 258 M. ft. B. M. sheeting, shoring, etc. 850 lin. ft. standard manholes. 80 manhole frames and covers. 375 manhole steps. 15,100 lin. ft. excavation for house-connections. 15,600 lin. ft. vitrified and cast-iron pipe house-connections. 645 branches. 3,000 sq. ft. granolithic pavement relaid. 7,000 lin. ft. vitrified block and other pavement relaid.	$65,868.50	$74,615.00	99 per cent.
Sanitary Contract No. 122, High Level Interceptor. Section No. 9.	James Ferry & Sons.	Dec. 8, 1913	6,934 cu. yds. earth excavation. 2,397 cu. yds. rock excavation. 225 branches. 100 cu. yds. concrete masonry. 1,000 lbs, reinforcing steel. 3,100 cu. yds. embankment. 3,100 lin. ft. 6″ and 8″ underdrain. 150 M. ft. B. M. sheeting, shoring, etc. 28 manhole frames and covers. 140 manhole steps. 200 lin. ft. house-connections.	$52,426.90	$53,718.23	None.

STATEMENT OF CONTRACTS LET DURING THE YEAR 1913, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION O WORK COMPLETED DEC. 31, 1913.
Sanitary Contract No. 123, Lateral Sewers, District No. 7.	....	....	....	....	....	Bids rejected and readvertisement postponed.
Sanitary Contract No. 124, Lateral Sewers, District No. 42.	Carozza Bros. & Co.	Dec. 31, 1913	17,000 lin. ft. 8″ sewer. 5,000 lin. ft. 10″ sewer. 800 lin. ft. 12″ sewer. 150 cu. yds. concrete masonry. 6,000 lin. ft. 4″ and 6″ underdrain. 410 M. ft. B. M. sheeting, shoring, etc. 1,350 lin. ft. manholes. 137 manhole frames and covers. 650 manhole steps. 12,800 lin. ft. excavation for house-connections. 13,775 lin. ft. vitrified and cast-iron pipe house-connections. 1,215 branches. 1,000 lin. ft. W. I. water supply pipe to manholes. 2,350 sq. ft. granolithic pavement relaid. 5,200 lin. ft. vitrified and other pavement relaid.	$80,552.25	$84,194.70	None.

STATEMENT OF CONTRACTS LET DURING THE YEAR 1913, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1913.
Storm-Water Contract No. 26.	McCarthy & O'Herron.	Apr. 14, 1913	3,305 lin. ft. 54"x36" to 78"x36" masonry drain. 11,585 lin. ft. 30" to 48" masonry drain. 335 lin. ft. 30" cast-iron pipe. 26,465 lin. ft. 12" to 24" T. C. pipe. 10,925 lin. ft. 12" to 18" inlet connections. 560 cu. yds. concrete masonry. 2,000 lbs. corrugated steel bars. 3,600 lbs. 6" to 12" "I" beams. 5,000 lin. ft. 4" to 8" underdrain. 560 M. ft. B. M. sheeting, shoring, etc. 1,500 lin. ft. piles. 600 cu. yds. rock excavation. 1,250 lin. ft. manholes. 220 manhole frames and covers. 1,200 manhole steps. 425 inlets.	$241,247.45	$250,874.05	Completed Dec. 15, 1913.
Storm-Water Contract No. 27.	Ryan & Reilly Company.	May 15, 1913	900 lin. ft. 30" masonry drain. 6,670 lin. ft. 12" to 24" T. C. pipe. 2,100 lin. ft. 12" to 18" inlet connections. 108 cu. yds. concrete masonry. 79 M. ft. B. M. sheeting, shoring, etc. 245 lin. ft. manholes. 200 cu. yds rock excavation. 73 inlets.	$29,025.05	$30,329.60	Completed Nov. 6, 1913.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1913, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1913.
Storm-Water Contract No. 28.	Guild & Co.	June 24, 1913	1,550 cu. yds. excavation for 120"x108" masonry drain. 3,305 lin. ft. 30" to 36" masonry drain. 13,635 lin. ft. 12" to 24" T. C. pipe. 4,565 lin. ft. 12" to 18" inlet connections. 85 cu. yds. brick masonry. 1,250 cu. yds. concrete masonry. 700 lbs. reinforcing steel. 1,400 lin. ft. 4" to 8" underdrain. 289 M. ft. B. M. sheeting, shoring, etc. 1,850 cu. yds. embankment. 183 inlets.	$83,718.10	$84,081.30	88 per cent.
Storm-Water Contract No. 29.	Whiting-Turner Construction Co.	July 12, 1913	485 lin. ft. excavation for 108"x36" drain. 260 lin. ft. excavation for 60"x33" drain. 80 lin. ft. 12" to 18" inlet connections. 715 cu. yds. concrete masonry. 48,000 lbs. corrugated steel bars. 740 lin. ft. 6" to 8" underdrain. 20 M. ft. B. M. sheeting, shoring, etc.	$12,262.00	$14,830.50	Completed Dec. 1, 1913.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1913, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1913.
Storm-Water Contract No. 30.	McCarthy & O'Herron.	Sept. 16, 1913	18,310 cu. yds. excavation for 12"x24" to 87"x120" masonry drain. 1,310 lin. ft. 6" to 24" T. C. pipe. 530 cu. yds. brick masonry. 5,785 cu. yds. concrete masonry. 65,000 lbs. corrugated steel bars. 5,800 lin. ft. 4" to 8" underdrain. 4,000 cu. yds, rock excavation. 2,700 cu. yds. embankment.	$93,916.75	$106,421.50	40 per cent.
Storm-Water Contract No. 31.	Ryan & Reilly Company.	Oct. 18, 1913	1,105 lin. ft. 30" to 33" masonry drain. 5,335 lin. ft. 12" to 24" T. C. drain. 880 lin. ft. 12" to 15" inlet connections. 105 cu. yds. concrete masonry. 1,100 lin. ft. 4" to 6" underdrain. 80 M. ft. B. M. sheeting, shoring, etc. 100 cu. yds. rock excavation. 500 lbs. reinforcing steel.	$26,542.90	$28,075.84	74 per cent.

TABLE No. 3—*Concluded.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1913, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1913.
Storm-Water Contract No. 32.	Guild & Co.	Nov. 12, 1913	1,550 cu. yds. excavation for 78″ drain. 1,760 lin. ft. 30″ to 42″ masonry drain. 1,320 lin. ft. 20″ to 24″ T. C. drain. 82 cu. yds. brick masonry. 730 cu. yds. concrete masonry. 1,000 lbs. reinforcing steel. 1,780 lin. ft. 4″ to 8″ underdrain. 150 cu. yds. rock excavation. 500 cu. yds. embankment.	$26,805.20	$27,697.70	55 per cent.
Storm-Water Contract No. 33.	Ryan & Reilly.	Dec. 26, 1913	5,215 lin. ft. 30″ to 50″x30″ masonry drain. 15,960 lin. ft. 15″ to 24″ T. C. drain. 3,750 lin. ft. 12″ to 18″ inlet connections. 410 cu. yds. concrete masonry. 2,400 lbs. reinforcing steel. 1,300 lin. ft. 4″ to 8″ underdrain. 205 M. ft. B. M. sheeting, shoring, etc. 50 cu. yds. rock excavation. 117 inlets.	$92,103.20	$93,664.00	None.

TABLE No. 4.

LENGTHS OF SANITARY SEWERS OF THE VARIOUS SIZES AND MATERIALS CONSTRUCTED TO DECEMBER 31, 1913.

SIZE AND SHAPE.	MATERIAL.	CONSTRUCTED PRIOR TO 1913. LINEAR FEET.	CONSTRUCTED DURING 1913. LINEAR FEET.	CONSTRUCTED TO DEC. 31, 1913. LINEAR FEET.
11′ x 12′ 3″ Horseshoe	Brick and Concrete	26,351.80	....	26,351.80
10′ 9″ x 12′ Horseshoe	Brick and Concrete	3,879.21	....	3,879.21
100″ Circular	Brick and Concrete	5,109.28	....	5,109.28
90″ Circular	Brick and Concrete	4,610.45	....	4,610.45
84″ Circular	Brick and Concrete	539.56	....	539.56
82″ Circular	Brick and Concrete	3,099.00	....	3,099.00
80″ Circular	Brick and Concrete	3,313.00	....	3,313.00
76″ Circular	Brick and Concrete	633.60	....	633.60
75″ Circular	Brick and Concrete	1,594.92	....	1,594.92
74″ Circular	Brick and Concrete	1,931.00	....	1,931.00
72″ Circular	Brick and Concrete	1,473.00	....	1,473.00
66″ Circular	Brick and Concrete	2,011.67	....	2,011.67
64″ Circular	Brick and Concrete	2,488.75	....	2,488.75
61″ Circular	Brick and Concrete	829.00	1,425.40	2,254.40
60″ Circular	Brick and Concrete	5,225.18	....	5,225.18
57″ Circular	Brick and Concrete	742.00	....	742.00
56″ Circular	Brick and Concrete	367.17	....	367 17
55″ Circular	Brick and Concrete	1,179.88	1,763.20	2,943.08
52″ Circular	Brick and Concrete	893.72	8,593.80	9,497.52
51″ Circular	Brick and Concrete	2,054.98	....	2,054.98
50″ Circular	Brick and Concrete	791.78	....	791.78
48″ Circular	Brick and Concrete	869.94	....	869.94
45″ Circular	Brick and Concrete	1,440.00	....	1,440.00
42″ Circular	Cast-Iron Pipe	11,979.63	449.40	12,429.03
36″ Circular	Cast-Iron Pipe	685.00	234.70	919.70
36″ Circular	Brick and Concrete	63.61	421.00	484.61
30″ Circular	Brick and Concrete	604.20	1,608.69	2,212.89

TABLE No. 4—*Concluded.*

LENGTHS OF SANITARY SEWERS OF THE VARIOUS SIZES AND MATERIALS CONSTRUCTED TO DECEMBER 31, 1913.

Size and Shape.	Material.	Constructed Prior to 1913. Linear Feet.	Constructed During 1913. Linear Feet.	Constructed to Dec. 31, 1913. Linear Feet.
30" Circular	Terra-Cotta Pipe	89.20	....	89.20
27" Circular	Brick and Concrete	3,474.60	....	3,474.60
27" Circular	Terra-Cotta Pipe	3,012.50	725.81	3,738.31
24" Circular	Terra-Cotta Pipe	9,701.46	2,169.53	11,870.99
24" Circular	Cast-iron Pipe	297.36	....	297.36
22" Circular	Terra-Cotta Pipe	12,807.81	1,855.24	14,663.05
20" Circular	Terra-Cotta Pipe	6,452.83	664.46	7,117.29
18" Circular	Terra-Cotta Pipe	9,204.84	1,574.83	10,779.67
16" Circular	Cast-Iron Pipe	1,240.44	....	1,240.44
15" Circular	Terra-Cotta Pipe	25,658.01	6,691.13	32,349.14
12" Circular	Terra-Cotta Pipe	28,096.14	14,355.32	42,451.46
10" Circular	Terra-Cotta Pipe	81,178.02	52,460.66	133,638.68
10" Circular	**Cast-Iron Pipe**	859.50	....	859.50
8" Circular	Cast-Iron Pipe	492.40	110.00	602.40
8" Circular	Terra-Cotta Pipe	556,632.24	154,489.18	710,989.42
Total length	....	823,958.68	249,592.35	1,073,551.03
House-connections	....	564,798.79	332,046.07	896,844.86
Grand total	....	1,388,757.47	581,638.42	1,970,395.89
Manholes		4,317	1,513	5,830
Lampholes		425	131	556
Spurs		48,656	17,001	65,657

TABLE No. 5.

LENGTH OF STORM-WATER DRAINS OF THE VARIOUS SIZES AND MATERIALS CONSTRUCTED TO DECEMBER 31, 1913.

SIZE.	MATERIALS.	CONSTRUCTED PRIOR TO 1913. LINEAR FEET.	CONSTRUCTED DURING 1913. LINEAR FEET.	TOTAL TO DEC. 31, 1913. LINEAR FEET.
Double Rectangular, 84" x 60"	Concrete and Brick (Reinf.)	108.30	....	108.30
Double Rectangular, 69" x 50"	Concrete and Brick (Reinf.)	2,856.91	....	2,856.91
Rectangular, 14' x 7' 6"	Concrete and Brick (Reinf.)	447.80	....	447.80
Rectangular, 132" x 66"	Concrete and Brick (Reinf.)	....	240.00	240.00
Rectangular, 108" x 36"	Concrete and Brick (Reinf.)	....	503.50	503.50
Rectangular, 78" x 36"	Concrete and Brick (Reinf.)	....	61.85	61.85
Rectangular, 72" x 51"	Concrete and Brick (Reinf.)	764.30	....	764.30
Rectangular, 72" x 36"	Concrete and Brick (Reinf.)	....	352.65	352.65
Rectangular, 72" x 30"	Concrete and Brick (Reinf.)	....	68.39	68.39
Rectangular, 69" x 36"	Concrete and Brick (Reinf.)	208.00	....	208.00
Rectangular, 66" x 45"	Reinforced Concrete	1,470.30	....	1,470.30
Rectangular, 64" x 31"	Concrete and Brick (Reinf.)	....	21.90	21.90
Rectangular, 62" x 42"	Concrete and Brick (Reinf.)	....	1,660.68	1,660.68
Rectangular, 60" x 42"	Concrete and Brick (Reinf.)	785.90	....	785.90
Rectangular, 60" x 33"	Reinforced Concrete	....	237.00	237.00
Rectangular, 60" x 30"	Concrete and Brick (Reinf.)	76.79	323.70	400.49
Rectangular, 56" x 42"	Concrete and Brick (Reinf.)	....	432.72	432.72
Rectangular, 54" x 36"	Concrete and Brick (Reinf.)	....	375.55	375.55
Rectangular, 52" x 36"	Concrete and Brick (Reinf.)	....	401.80	401.80
Rectangular, 48" x 48"	Concrete and Brick (Reinf.)	....	120.00	120.00
Horseshoe, 12' 3" x 12' 3"	Concrete and Brick	....	2,509.00	2,509.00
Horseshoe, 12' 0" x 12' 0"	Concrete and Brick	....	1,717.93	1,717.93

TABLE No. 5—*Continued.*

LENGTH OF STORM-WATER DRAINS OF THE VARIOUS SIZES AND MATERIALS CONSTRUCTED TO DECEMBER 31, 1913.

SIZE.	MATERIALS.	CONSTRUCTED PRIOR TO 1913. LINEAR FEET.	CONSTRUCTED DURING 1913. LINEAR FEET.	TOTAL TO DEC. 31, 1913. LINEAR FEET.
Horseshoe, 138" x 132"	Concrete and Brick (Reinf.)	125.13		125.13
Horseshoe, 138" x 99"	Concrete and Brick (Reinf.)	2,212.22		2,212.22
Horseshoe, 120" x 108"	Concrete and Brick		385.00	385.00
Horseshoe, 120" x 87"	Concrete and Brick		49.00	49.00
Horseshoe, 120" x 75"	Concrete and Brick		1,250.00	1,250.00
Horseshoe, 114"	Concrete and Brick	244.65		244.65
Horseshoe, 96" x 93"	Concrete and Brick	56.00		56.00
Horseshoe, 87"	Concrete and Brick	1,300.28		1,300.28
Double Line, 30"	Cast-Iron Pipe	645.17		645.17
Circular, 144"	Concrete and Brick		160.00	160.00
Circular, 120"	Concrete and Brick		9.22	9.22
Circular, 114"	Concrete and Brick	1,112.69		1,112.69
Circular, 96"	Concrete and Brick	3,451.55		3,451.55
Circular, 78"	Concrete and Brick		150.00	150.00
Circular, 72"	Concrete and Brick	1,259.91	29.50	1,289.41
Circular, 69"	Concrete and Brick	1,926.04	725.00	2,651.04
Circular, 66"	Concrete and Brick	169.35		169.35
Circular, 62"	Concrete and Brick (Reinf.)	245.64		245.64
Circular, 60"	Concrete and Brick	233.09	329.82	562.91
Circular, 57"	Concrete and Brick	83.47		83.47
Circular, 54"	Concrete and Brick		617.98	617.98
Circular, 54"	Concrete and Brick (Reinf.)	1,753.05		1,753.05

TABLE No. 5—*Continued.*

LENGTH OF STORM-WATER DRAINS OF THE VARIOUS SIZES AND MATERIALS CONSTRUCTED TO DECEMBER 31, 1913.

SIZE.	MATERIALS.	CONSTRUCTED PRIOR TO 1913. LINEAR FEET.	CONSTRUCTED DURING 1913. LINEAR FEET.	TOTAL TO DEC. 31, 1913. LINEAR FEET.
Circular, 50″	Concrete and Brick		13.00	13.00
Circular, 48″	Concrete and Brick	714.84	29.00	743.84
Circular, 48″	Cast-Iron Pipe	41.99		41.99
Circular, 48″	Brick	1,453.27	4.00	1,457.27
Circular, 48″	Concrete	1,624.25	2,701.55	4,325.80
Circular, 45″	Concrete	471.51		471.51
Circular, 42″	Cast-Iron Pipe	34.35	184.00	218.35
Circular, 42″	Brick	1,689.96		1,689.96
Circular, 42″	Concrete and Brick	1,751.59	12.26	1,763.85
Circular, 42″	Concrete	4,132.47	4,301.56	8,434.03
Circular, 36″	Cast-Iron Pipe	24.00	162.00	186.00
Circular, 36″	Brick	648.97	7.16	656.13
Circular, 36″	Concrete and Brick	7,223.91	25.00	7,248.91
Circular, 36″	Concrete	11,014.43	8,810.70	19,825.13
Circular, 33″	Brick	44.35	51.45	95.80
Circular, 33″	Concrete and Brick	8,004.61		8,004.61
Circular, 33″	Concrete	2,642.60	7,150.44	9,793.04
Circular, 30″	Cast-Iron Pipe	1,028.33	1,598.25	2,626.58
Circular, 30″	Brick	235.67	25.78	261.45
Circular, 30″	Concrete and Brick	10,296.51	38.09	10,334.60
Circular, 30″	Vitrified Pipe	2,452.19		2,452.19
Circular, 30″	Concrete	9,371.77	16,896.36	26,268.13

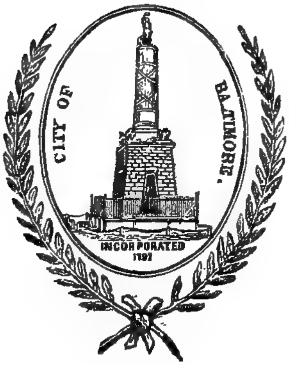
TABLE No. 5—*Concluded.*

LENGTH OF STORM-WATER DRAINS OF THE VARIOUS SIZES AND MATERIALS CONSTRUCTED TO DECEMBER 31, 1913.

Size.	Materials.	Constructed Prior to 1913. Linear Feet.	Constructed During 1913. Linear Feet.	Total to Dec. 31, 1913. Linear Feet.
Circular, 27"	Terra-Cotta Pipe		365.31	365.31
Circular, 24"	Cast-Iron Pipe	500.00	419.63	919.63
Circular, 24"	Terra-Cotta Pipe	47,706.56	20,976.43	68,682.99
Circular, 20"	Cast-Iron Pipe	410.83	100.80	511.63
Circular, 20"	Terra-Cotta Pipe	18,418.72	15,177.06	33,595.78
Circular, 18"	Terra-Cotta Pipe	41,397.79	28,964.92	70,362.71
Circular, 18"	Cast-Iron Pipe	26.50		26.50
Circular, 16"	Cast-Iron Pipe	38.70	653.80	692.50
Circular, 15"	Terra-Cotta Pipe	35,068.61	28,691.22	63,759.83
Circular, 12"	Terra-Cotta Pipe	6,597.57	1,813.82	8,411.39
Circular, 12"	Cast-Iron Pipe		170.00	170.00
Circular, 10"	Cast-Iron Pipe	190.00	1.339.34	1,529.34
Circular, 10"	Terra-Cotta Pipe		237.00	237.00
Circular, 8"	Cast-Iron Pipe	156.93	220.07	377.00
Circular, 8"	Terra-Cotta Pipe		52.00	52.00
Circular, 6"	Cast-Iron Pipe	219.84	173.78	393.62
Circular, less than 6"	Terra-Cotta Pipe		70.00	70.00
Jones Falls Conduits	Reinforced Concrete	2,589.00	3,721.00	6,310.00
Totals		239,759.16	157,888.97	397,648.13
Inlet Connections, 10" to 20"		60,169.59	40,895.11	101,064.70
Grand totals		299.928.75	198,784.08	498,712.83
Inlets and Catch Basins		2,086	1,640	3,726
Manholes and Drop Wells		1,469	848	2,317
Lampholes			12	12

Annual Report
of the
Sewerage Commission
of the
City of Baltimore

1912



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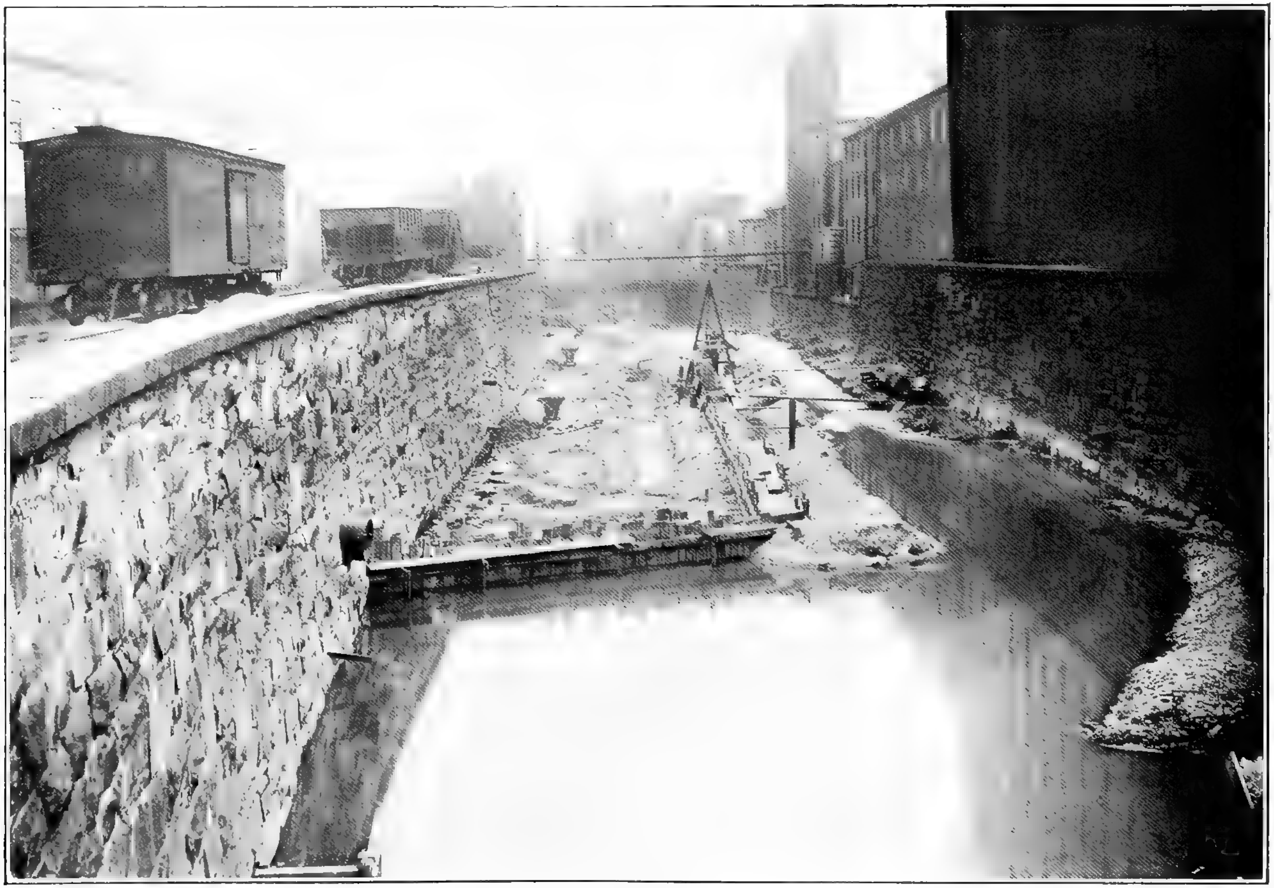
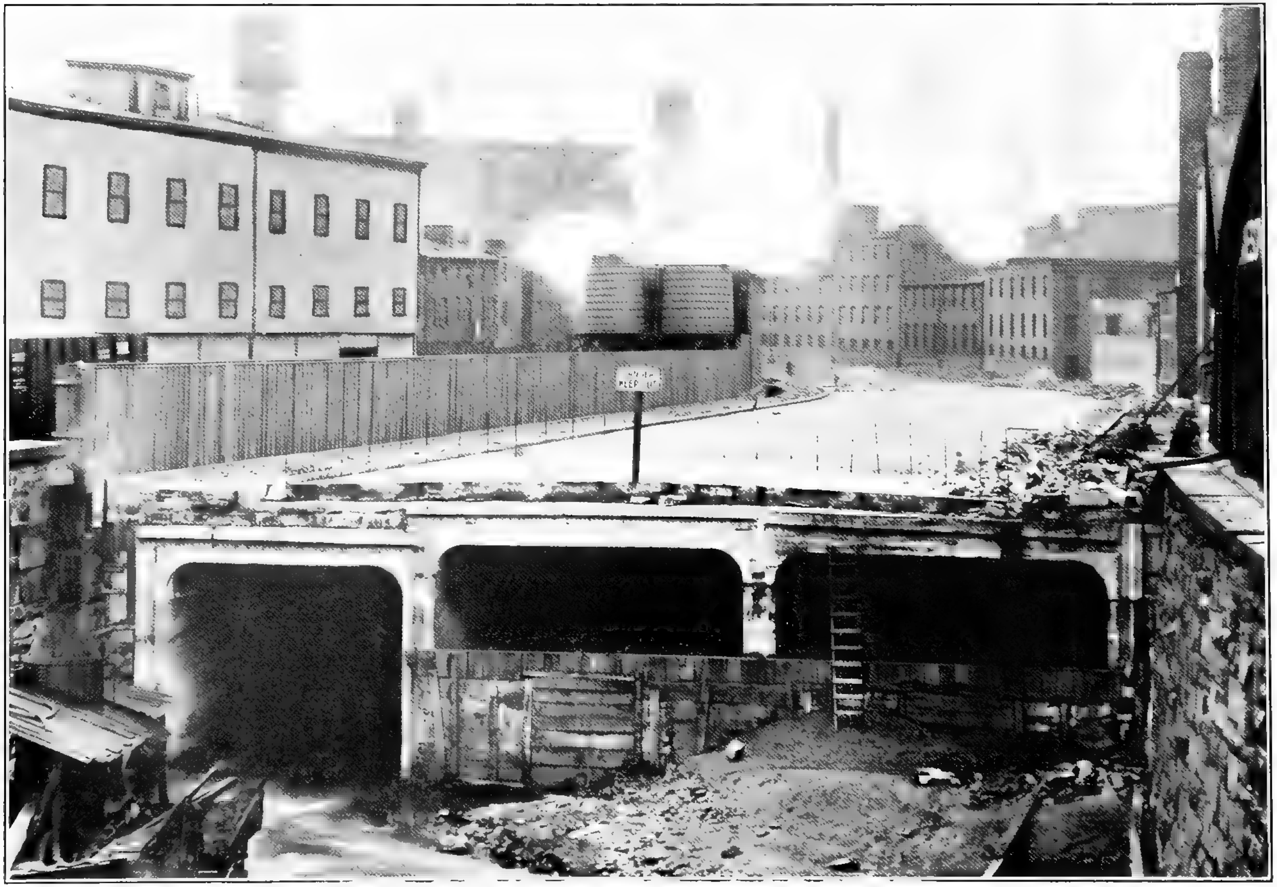


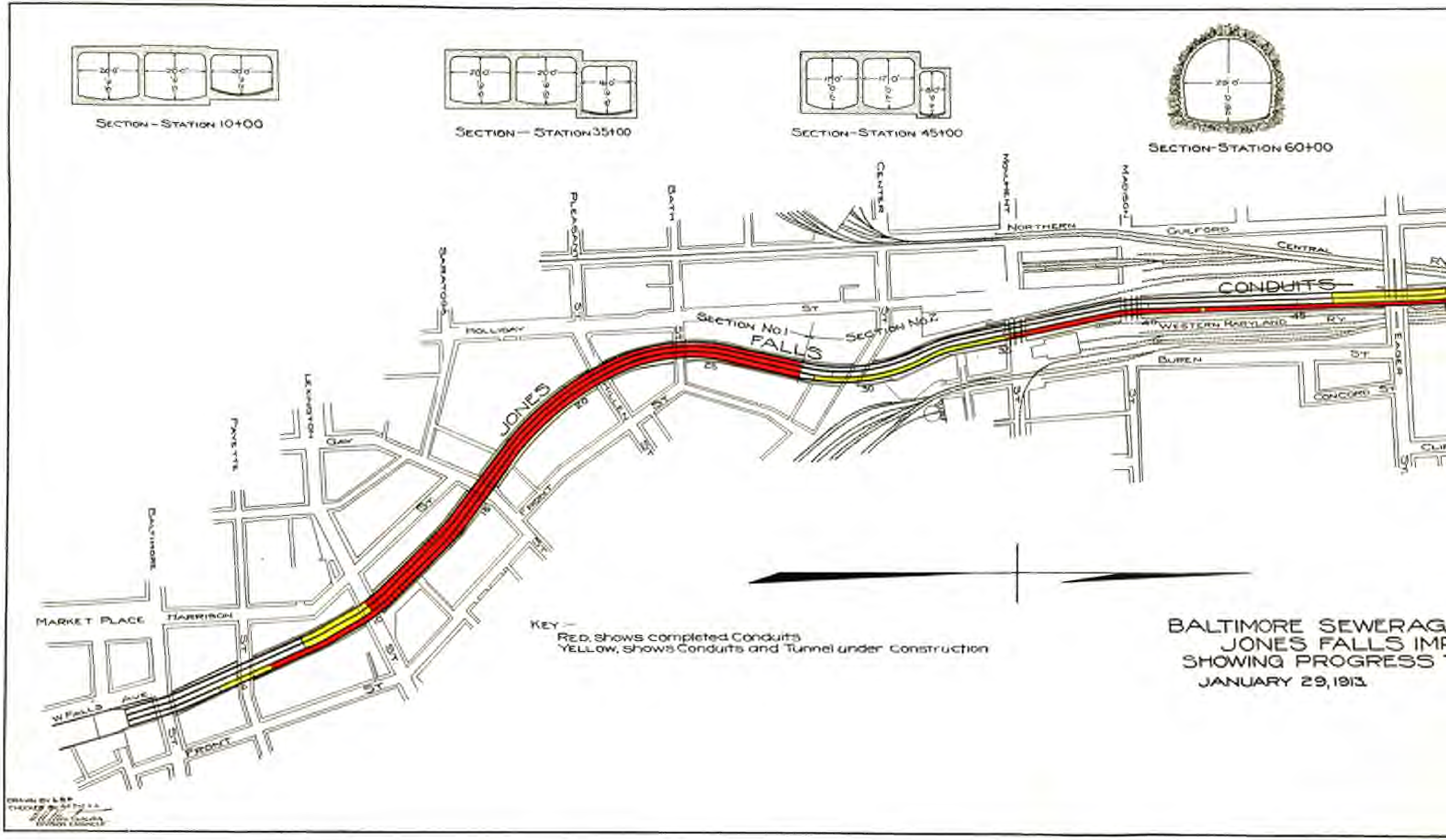
JONES' FALLS CONDUITS, SECTION No. 1.

Looking South from Centre Street Bridge, Showing Cofferdam Ready for East Conduit.



JONES' FALLS CONDUITS, SECTION No. 1.

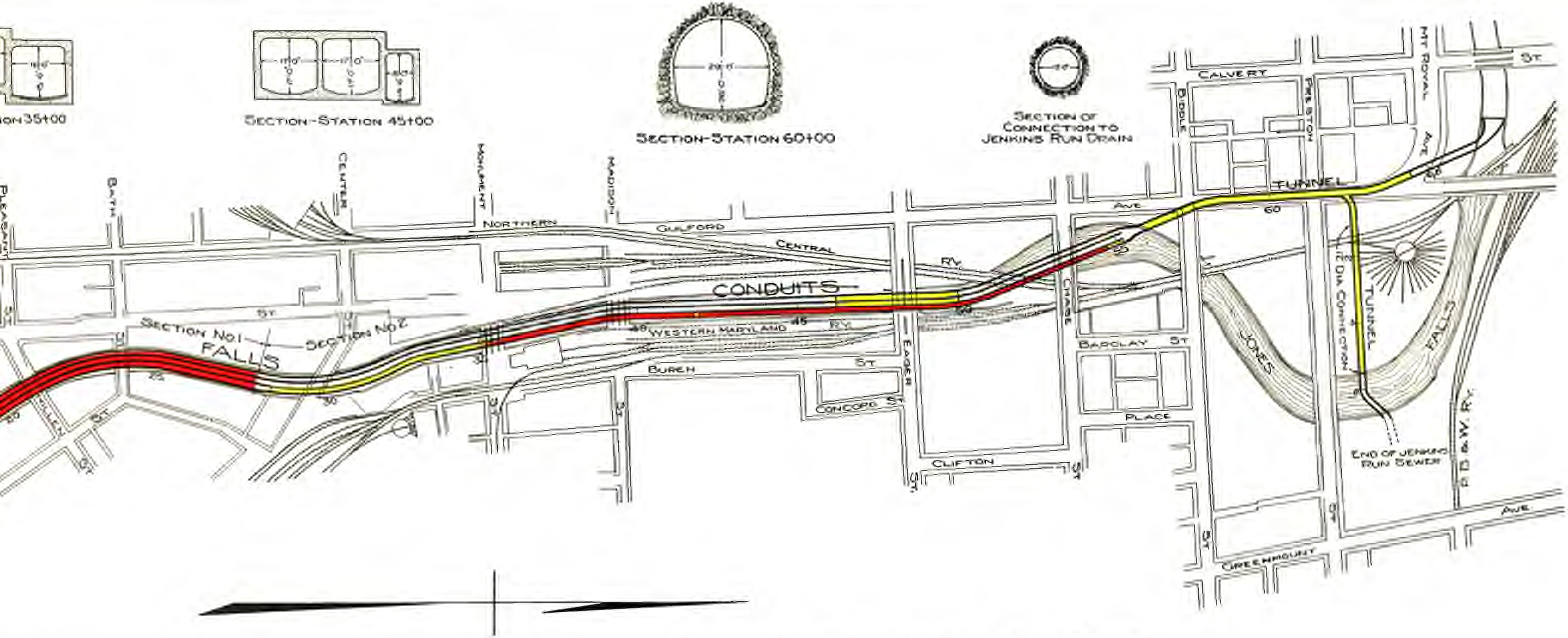
Looking South from Centre Street Bridge, Showing Conduits and Fallsway Paving Completed.



KEY:—
RED, shows completed Conduits
YELLOW, shows Conduits and Tunnel under construction

BALTIMORE SEWERAG
JONES FALLS IMP
SHOWING PROGRESS
JANUARY 29, 1913

DRAWN BY L.S.P.



ED, shows completed Conduits
ELLOW, shows Conduits and Tunnel under Construction

BALTIMORE SEWERAGE COMMISSION
JONES FALLS IMPROVEMENT
SHOWING PROGRESS TO DEC. 31, 1912
JANUARY 29, 1913 SCALE-1"-200'

Calvin W. Hendrick
Chief Engineer

SEWERAGE COMMISSION

OF THE

CITY OF BALTIMORE

AMERICAN BUILDING

BALTIMORE, December 31, 1912.

HON. JAMES H. PRESTON,
Mayor of Baltimore.

SIR:

In pursuance with the requirement of Section 1, Chapter 349, of the Acts of General Assembly of Maryland of 1904, that the Sewerage Commission shall annually make to the Mayor a detailed report of its official transactions and expenditures, we have the honor to report:

The death of William W. McIntire, March 3, 1912, also that of J. Edward Mohler, August 6, 1912, deprived the Commission of two most useful members. Mr. McIntire had been a member of the Commission less than one year, while Mr. Mohler was one of the original appointees. Both served the City's interests faithfully, always appreciating the responsibilities of their positions. They were highly esteemed by their colleagues on the Commission, and their deaths deeply deplored.

On April 16, 1912, William B. Kines, was appointed to fill the vacancy caused by the death of William W. McIntire, and on September 10, 1912, Gustav Siegmund was named as successor to J. Edward Mohler.

ACCOUNTS AUDITED.

The books and accounts of the Commission were duly examined by the Baltimore Audit Company, from the date of the last audit to the close of the business December 31, 1912. The Audit Company reports as follows:

"We have completed, under our contract with the Mayor and City Council of Baltimore, an audit and examination of your books and accounts for the year 1912, which included the examination of original vouchers at the Comptroller's office in the City Hall, and are pleased to state that everything was found to be correct and in good order.

"During the course of our examination we have made the usual complete audit of the details of your books, and wish to comment upon the efficient manner in which they are kept."

EXPENDITURES 1912.

There has been submitted to the City Comptroller a complete and detailed statement of disbursements for the year 1912 as follows:

Construction	$2,181,838 22
Construction salaries	187,562 18
Administrative salaries	27,428 99
Special expenses	36,261 26
	$2,433,090 65
CREDIT—	
By amount derived from sale of plans and supervision of private drain construction, rent, old material, etc.	5,352 13
Net amount expended in 1912	$2,427,738 52

CONTRACTS LET IN 1912.

Sanitary Contract No. 80, Bond & Bates	$15,917 95
Sanitary Contract No. 83, Pacific Flush Tank Co	2,509 00
Sanitary Contract No. 79, M. J. Beach	35,527 10
Sanitary Contract No. 81, Ryan & Reilly	171,367 75
Sanitary Contract No. 84, Ryan & Reilly	12,832 25
Sanitary Contract No. 85, Gallagher, Boyle & Mueller	24,711 50
Storm-water Contract No. 19, B. F. Sweeten & Son	51,284 85
Storm-water Contract No. 20, Ryan & Reilly	18,895 00
Sanitary Contract No. 86, B. F. Sweeten & Son	92,424 35
Sanitary Contract No. 87, B. F. Sweeten & Son	163,976 00
Sanitary Contract No. 88, James Ferry & Sons	84,904 50
Sanitary Contract No. 89, H. C. Brooks & Co	44,840 00
Sanitary Contract No. 90, Ryan & Reilly	44,240 25
Coal, Lynah & Read	4,080 00
Storm-water Contract No. 21, C. B. Clark & Co	103,316 45
Sanitary Contract No. 91, Carozza & Lavezza	3,549 20
Sanitary Contract No. 92, Gallagher, Boyle & Mueller	30,697 50
Sanitary Contract No. 93, William McCarthy & Co	65,249 50
Sanitary Contract No. 94, Gallagher, Boyle & Bryan	36,121 25
Sanitary Contract No. 95, Ryan & Reilly	109,383 50
Storm-water Contract No. 22, B. F. Sweeten & Son	164,972 72
Sanitary Contract No. 97, Gallagher, Boyle & Bryan	35,690 55
Sanitary Contract No. 98, James Ferry & Son	39,846 75
Sanitary Contract No. 99, William McCarthy & Co	31,358 00
Sanitary Contract No. 100, Lane Bros. Co	400,772 00
Sanitary Contract No. 101, Standard Lime and Stone Co.	487,550 00
Sanitary Contract No. 102, C. B. Clark & Co	117,503 10
Sanitary Contract No. 103, Ryan & Reilly	38,733 65
Storm-water Contract No. 23, William McCarthy & Co	5,990 27
Sanitary Contract No. 104, William McCarthy & Co	80,289 75
Sanitary Contract No. 105, Carozza & Lavezza	20,768 45
Sanitary Contract No. 106, William McCarthy & Co	37,834 25
Storm-water Contract No. 24, B. F. Sweeten & Son	166,194 00
Storm-water Contract No. 25, James Ferry & Sons	279,990 25
	$3,023,321 64

There was steady progress in the work of the Commission during the year. The large amount of construction, involving the expenditure of considerable sums of money, correspondingly increased the business of the Commission, and added to its work and responsibility in the proper disbursement and accounting of such large sums. The report of the Chief Engineer, covering in detail the work of his Department, is submitted herewith.

SEWERS IN ORANGEVILLE.

A request was received from the Orangeville Improvement Association of Baltimore County, inquiring upon what terms the inhabitants of that section could connect with the out-fall sewer. After a consultation with the City Solicitor the Orangeville Improvement Association was informed that according to the Act of the Legislature, application must be made through the County Commissioners of Baltimore County, acting as a Highway Commission for Baltimore County, and that any connection with the out-fall sewer must be approved by the Chief Engineer of the Sewerage Commission; and the work of tapping the out-fall sewer must be done by the County Commissioners, and at their expense, but under the direction and control of the Chief Engineer of the Sewerage Commission. Also, that the County Commissioners pay the cost of disposing of the sewage thus brought into the out-fall sewer, which cost shall include not only the actual cost of pumping and disposing of the sewage, but also the pro-rata cost of maintaining the disposal plant.

SLUDGE DISPOSAL.

There was introduced in the City Council an Ordinance granting the exclusive right and privilege, to parties named therein, to take the sludge of all sewage assembled at the City's Sewage Disposal Plant at Back River, in return for which the City was to receive a certain per cent. of the gross receipts from the business of handling and sale of the sludge. The Commission, in opposition to this measure, appeared before a Joint Committee of the City Council, to which it was referred, and where it is now pending. The Commission has always regarded the possibilities of revenue from the disposal of the sludge or solid matter obtained from the sewage at the Disposal Plant, but deem it most unwise for the City to enter into any contract or agreement until a more general house connection with the sewerage system will enable the Commission by investigation to ascertain more fully the commercial value of the sludge. Such an investigation in the future can alone determine whether it is more desirable for the City to dispose of the sludge by preparing it for marketing purposes, or by receiving competitive bids for it in its crude state. The fact that the Commission has received propositions for the purchase of the sludge, other than that contemplated in the ordinance, shows unmistakably that in this, as in all other matters of contract on the part of the City, competitive bidding is the only proper basis.

SEWERING OF BAY VIEW AND BUILDINGS.

Upon your request and in accord with a suggestion of the Board of Supervisors of City Charities, the Commission directed that a lateral sewer be constructed from Bay View to the out-fall sewer; also that connections with the various buildings be made with the lateral, and the Chief Engineer was further directed to make an extended study of the rearrangement of the existing drains, as desired by the Supervisors of City Charities. Later, Sydenham Asylum was included. This being City property in Baltimore County, its sewering was authorized by one of the Acts passed by the Legislature.

JONES FALLS' VIADUCT

In accordance with a request of the Board of Estimates, it was decided that, in order to meet certain requirements, the work of placing the foundations of the Jones' Falls Viaduct, between Eager and Chase streets, be done in connection with the construction of the Jones' Falls conduits, and under Contract No. 2. The Board of Estimates agreed that the Sewerage Fund should be fully reimbursed in the Ordinance of Estimates, to be taken out of the Jones' Falls Loan Fund.

DRESDEN INTERNATIONAL HYGIENIC EXPOSITION.

Information was received from the Dresden International Hygienic Exposition that the Sewerage Commission's Exhibit at that Exposition had been awarded a diploma. This diploma will be duly forwarded to this City from Dresden.

Respectfully,

Charles England, *Chairman,*
James H. Preston, *Ex-Officio,*
William D. Platt,
Morris Whitridge,
Ira Remsen,
William B. Kines,
Gustav Siegmund.

Harry W. Rodgers, *Secretary.*

ANNUAL REPORT

OF THE

Chief Engineer for the Year 1912

BALTIMORE, December 31, 1912.

MR. CHARLES ENGLAND, *Chairman; and*
Gentlemen of the Sewerage Commission.

DEAR SIRS:

I have the honor to present to you a report upon the work done by the Engineering Department of the Commission from January 1, 1912, to December 31, 1912.

The total value of the work done during the year was $2,534,402.55.

In addition to prosecuting work on contracts carried over from the previous year, we have let during 1912, 34 contracts, amounting to $3,023,321.64.

The total length of sewers and drains laid from the beginning of the work to December 31, 1912, is 1,688,684.09 linear feet, or 319.83 miles, ranging in size from 5 inches to 12 feet in diameter.

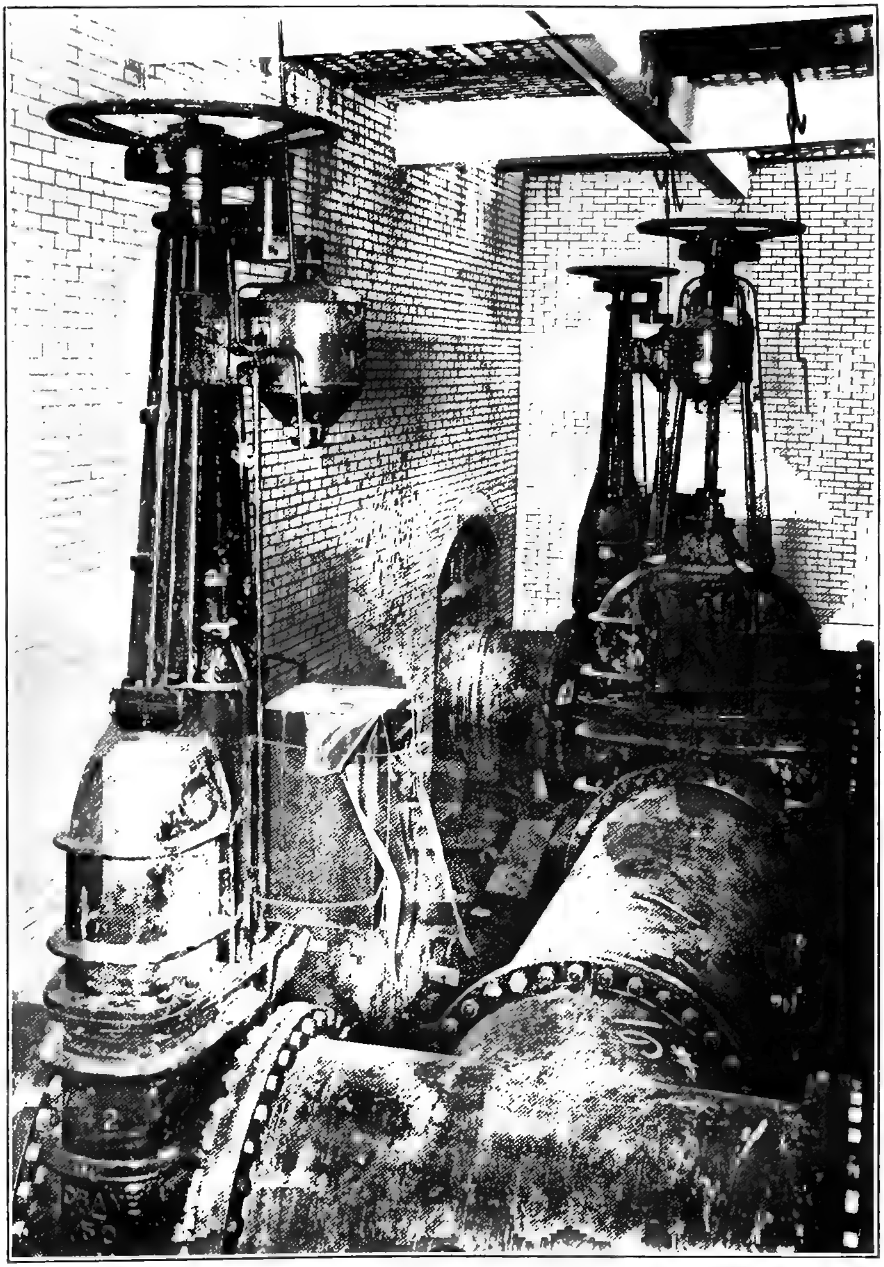
In addition to the above, we have completed sufficient units at the Disposal Plant to care for the sewage from approximately 275,000 people, and have just let additional contracts for units to bring the capacity of the plant up to 600,000 people. We have also completed and placed in operation the Sewerage Pumping Station, with three 27,500,000-gallon pumps.

One of the important features of the year was the completion of the sewage pumps at the Pumping Station and placing them in operation. Elaborate ceremonies were held on January 31, and the three pumps were started for the first time by His Honor, Mayor James H. Preston. Mr. Charles M. Schwab, President of the Bethlehem Steel Company, the builder of the pumps, was present, as were also the members of the Commission and other prominent City officials. The operation of these pumps since that date has been in every way most satisfactory and fully up to our expectations.

The past year has been one of great activity on the part of everyone connected with the sewerage, drainage and disposal construction. The difficulties have been greatly increased on account of the extensive paving program, necessitating our having to readjust the method of carrying on the sewer work from that which has been followed heretofore, on account of having to scatter our work in small pieces.

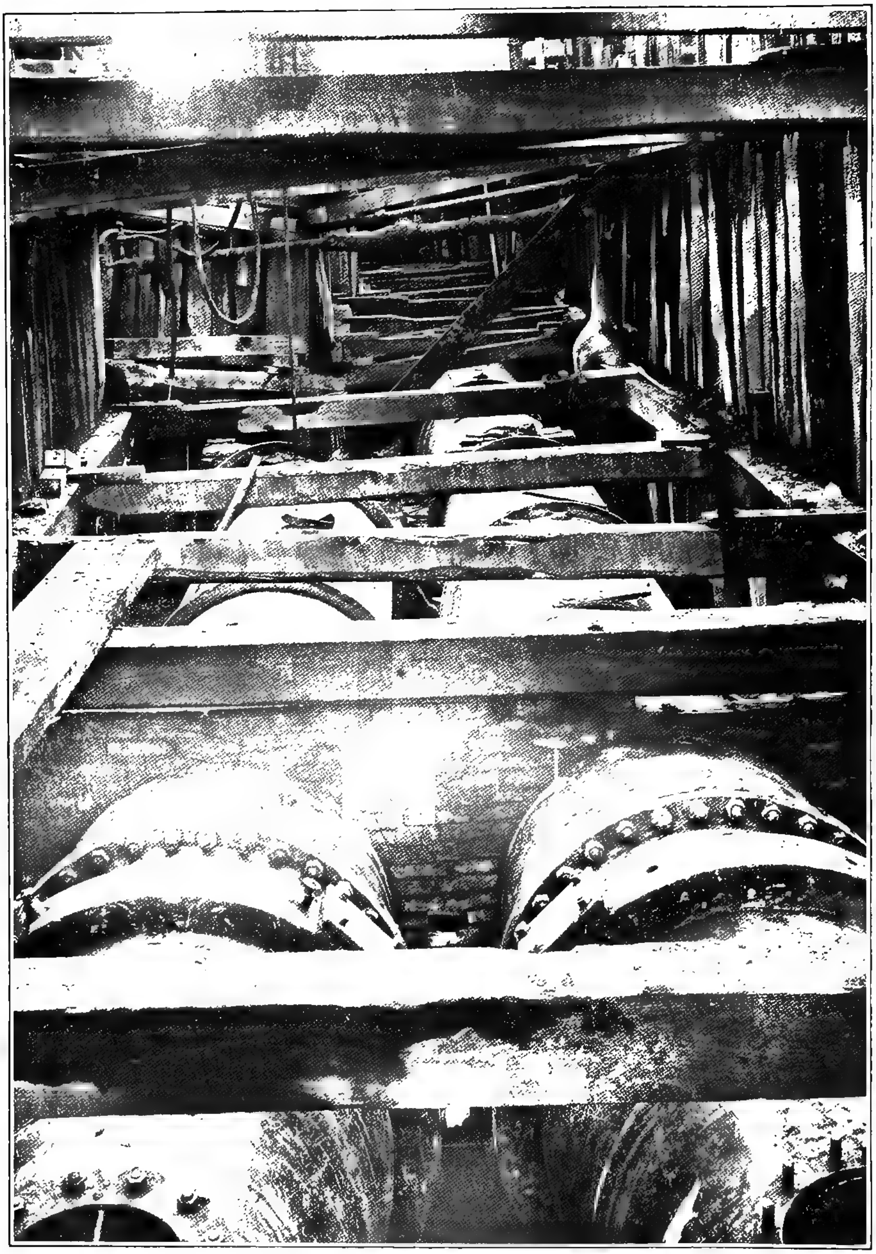
In planning for the expenditure of the first loan, the sanitary work was given precedence over the storm-water construction, and storm-water drains were only constructed where damage suits against the City had been instituted, and upon urgent requests from the City Solicitor, Board of Health and City Engineer to relieve conditions in other sections which were acute. Therefore, large areas of sanitary sewers were completed, with but few storm-water drains in these sections.

When the Paving Commission began active operations, it was found necessary to build the storm-water drains, in order to eliminate the cross-gutters. The Commission, in the meantime, having received the second loan, promptly began the introduction of storm-water drains in these sections, and also, at additional cost to both the contractors and the Commission, built sections of sanitary sewers in various streets in order to co-operate with the Paving Commission. This has entailed an enormous amount of extra work on the engineering, designing and construction departments, and has added very greatly



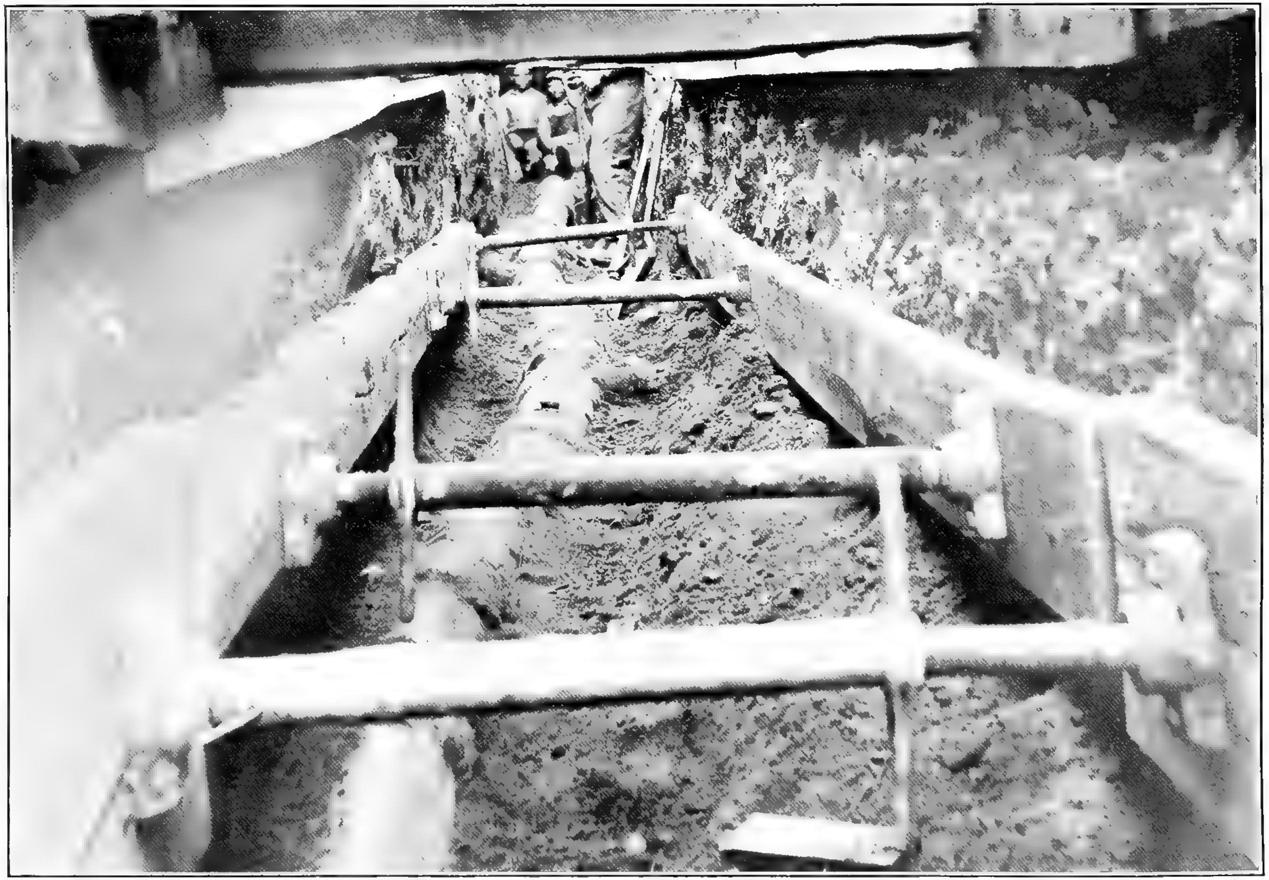
SEWAGE PUMPING STATION.

Discharge Piping from Engines No. 1 and No. 2, and Electrically-Operated Valves.

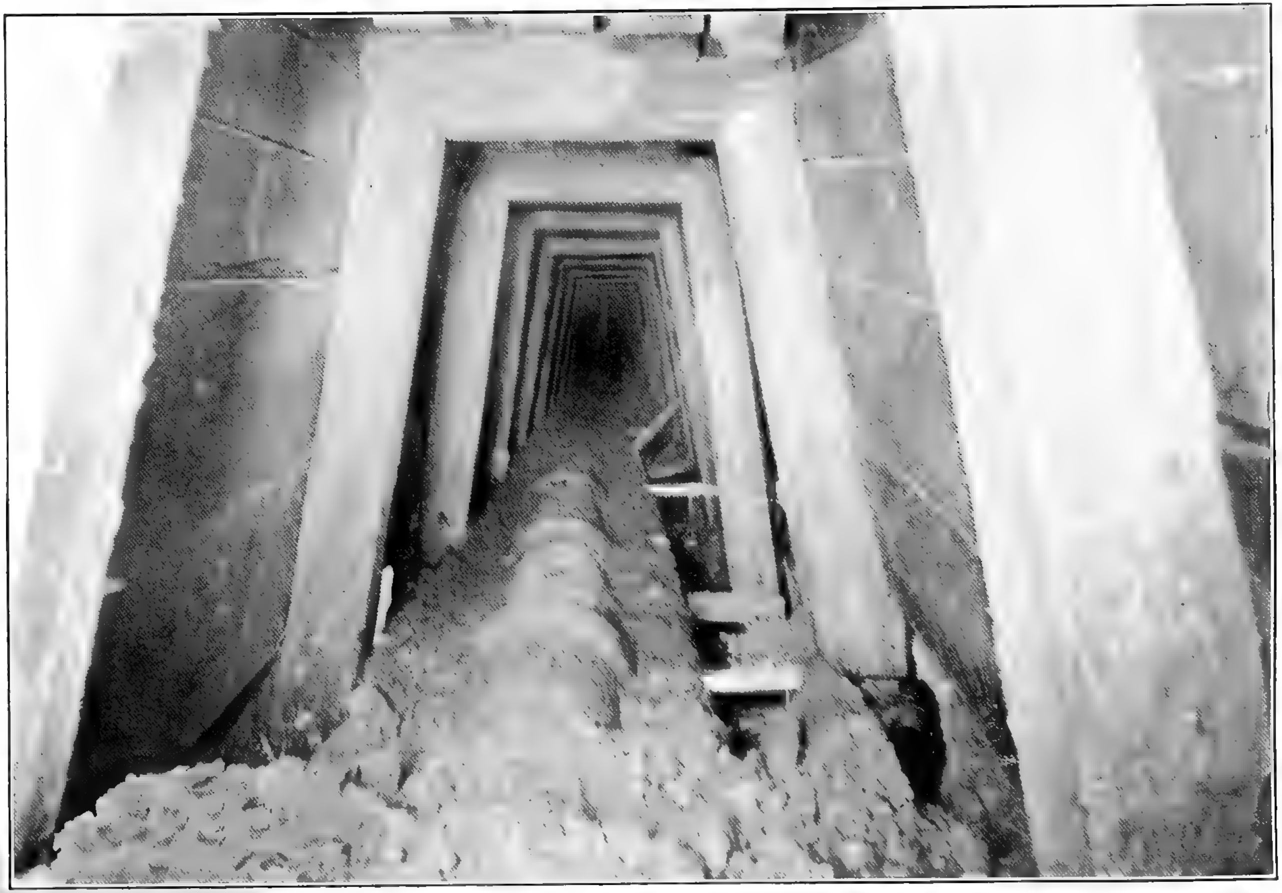


SEWAGE PUMPING STATION.

Up-Stream Pressure-Chambers of 42-Inch Venturi Meters in Force Mains Leading from Pumping Station.



PRIVATE DRAIN UNCOVERED IN SANITARY SEWER TRENCH, SHOWING CROOKED ALIGNMENT.

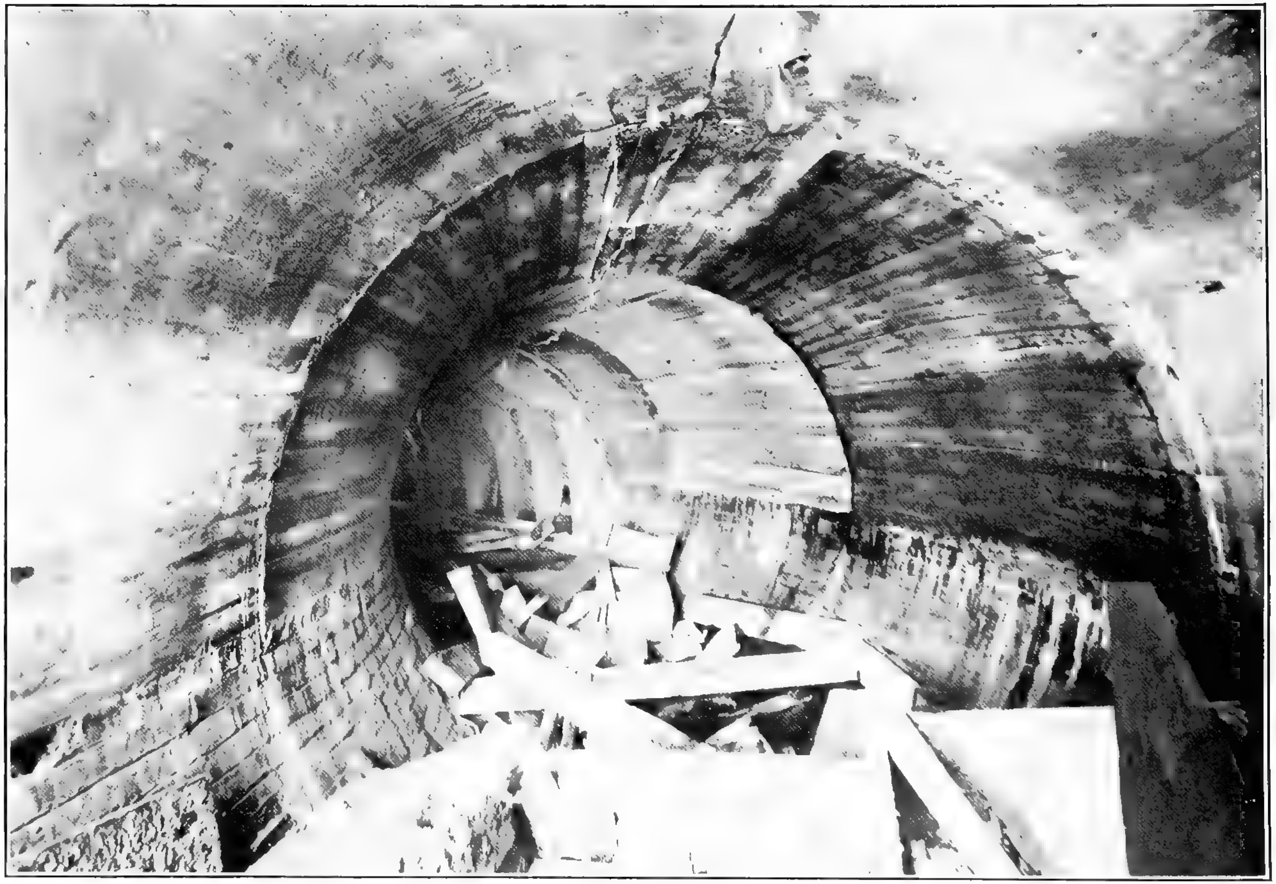


LATERAL SANITARY SEWER IN TUNNEL, BALTIMORE AND NORTH STREETS.

The Sewer Has Been Completed and Imbedded in Concrete, Ready for the Backfilling of the Tunnel.

HIGH LEVEL INTERCEPTOR.

Tunnel at Madison and Cathedral Streets. Inspection by His Honor, Mayor James H. Preston, Chief Engineer Calvin W. Hendrick and Members of the Sewerage Commission.



HIGH LEVEL INTERCEPTOR.

Completed Curve at Centre and Cathedral Streets. Diameter of Sewer, 82 Inches.

to the difficulties of the contractors in prosecuting their work, on account of having, in many cases, no outlet for the groundwater. This co-operation on the part of the Commission, however, has resulted in the Paving Commission being able to let and construct a large amount of paving work.

In addition to the large mileage of sanitary lateral sewers constructed during the year, one of the most important pieces of sanitary work undertaken was the Locust Point Interceptor, which skirts the south side of the harbor. At the end of the year the contractor had completed quite a large section of this sewer in York street, between Light street and Battery avenue, and in Hughes street east of Battery avenue.

On the High Level Interceptor over a mile of tunnel has been driven under the streets of the City, bordered by expensive buildings, part of which was in very wet and soft material, making the work very difficult.

An important link in the High Level Interceptor is the siphon on Eager street, crossing Jones Falls, consisting of one 36-inch and two 42-inch cast-iron pipes, depressed to pass under the tracks of the Pennsylvania Railroad and the Western Maryland Railway and over the Jones Falls Conduits. With the completion of this work there will be an outlet for all the high level laterals east of Myrtle avenue and Saratoga street, and a continuous sewer from this point to Back River.

A large part of the work of the year was the no less necessary, but less interesting, work on the lateral sewers and house-connections. This work involves a vast amount of detail in connection with obstructions, investigating and locating house-connections to best serve the properties affected, and many other matters which in themselves seem small, but which if not properly looked after would create a large amount of trouble and complaint.

The large number of private sewers in the alleys now being sewered adds greatly to the difficulty of the work. In one fifteen-foot alley four 8-inch and five 6-inch private drains were encountered. In this alley there was a great amount of running water and sand, and a 6-inch water main.

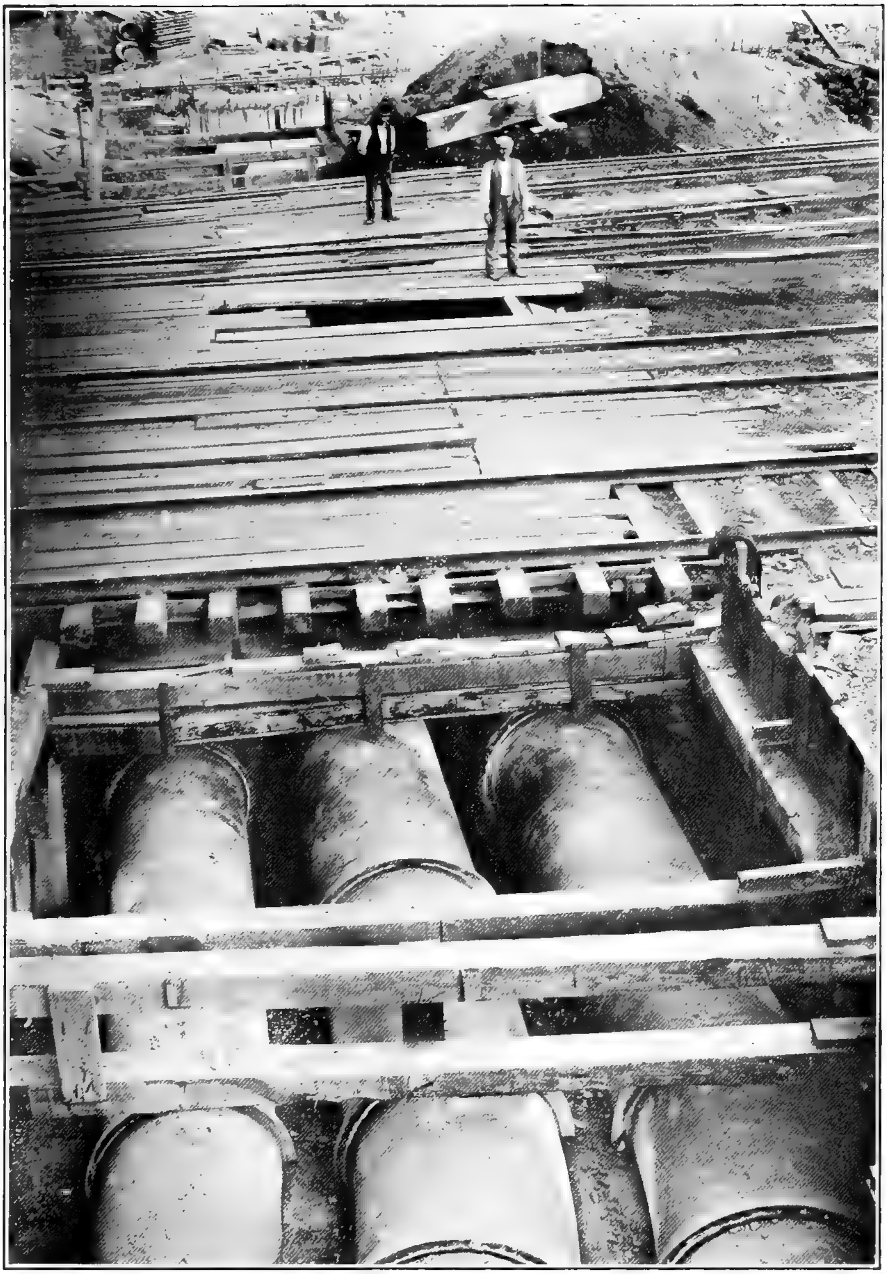
The alley construction is unusually difficult on account of the surface drainage and the proximity of old buildings, in addition to underground obstructions. We have been very fortunate in getting through with so little damage.

Although contract plans for the storm-water system have been prepared, including work in all sections of the City, a special effort was made to complete as much of the system in South Baltimore as practicable, so that a large part of the work included in Storm-Water Contracts Nos. 21, 22, 23 and 24 is in South Baltimore. As soon as this work is completed, in connection with the sanitary system, the streets in this section will be rapidly released to the Paving Commission for paving, and in a very short time this section of the City will not only be possessed of complete sewerage and drainage systems, but also improved paving.

JONES FALLS WORK.

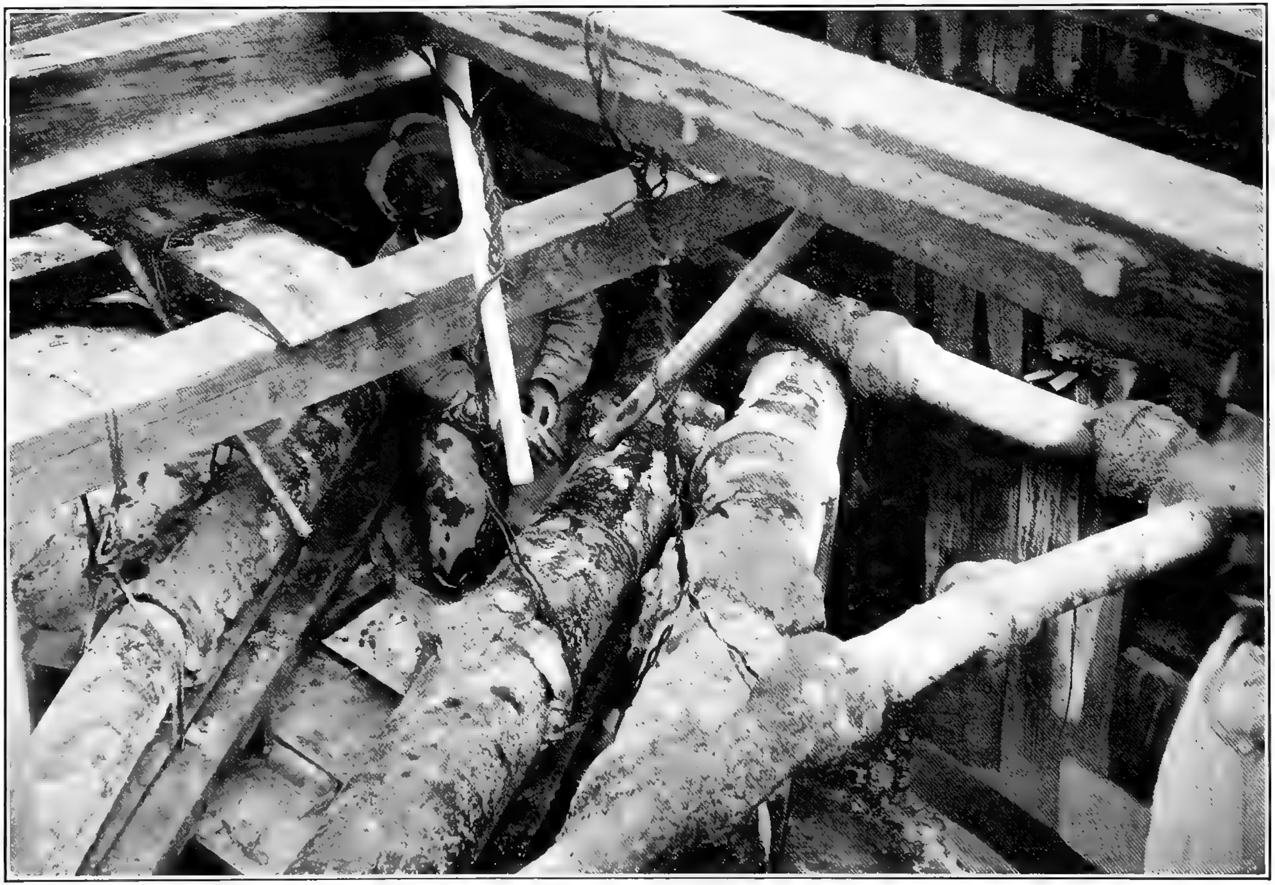
The Jones Falls work has proceeded in a most satisfactory manner, notwithstanding the contractors had to encounter one of the most severe winters in forty years, together with numerous heavy floods..

The Falls have been entirely enclosed for a distance of 1,940 feet; in addition, 2,672 feet of the East Conduit has been completed. The heading of the tunnel under Guilford avenue has been extended from the entrance of the retaining wall, between Biddle and Chase streets, to a point 250 feet beyond Preston street, a total distance of 800 feet. The heading of the Jenkins Run Sewer tunnel has been extended through to meet the large tunnel, a distance of 430 feet. The rock excavated from this tunnel is being crushed and used to form the concrete conduits in the bed of the Falls below Chase street. This was taken into consideration and included in our approximate estimates when



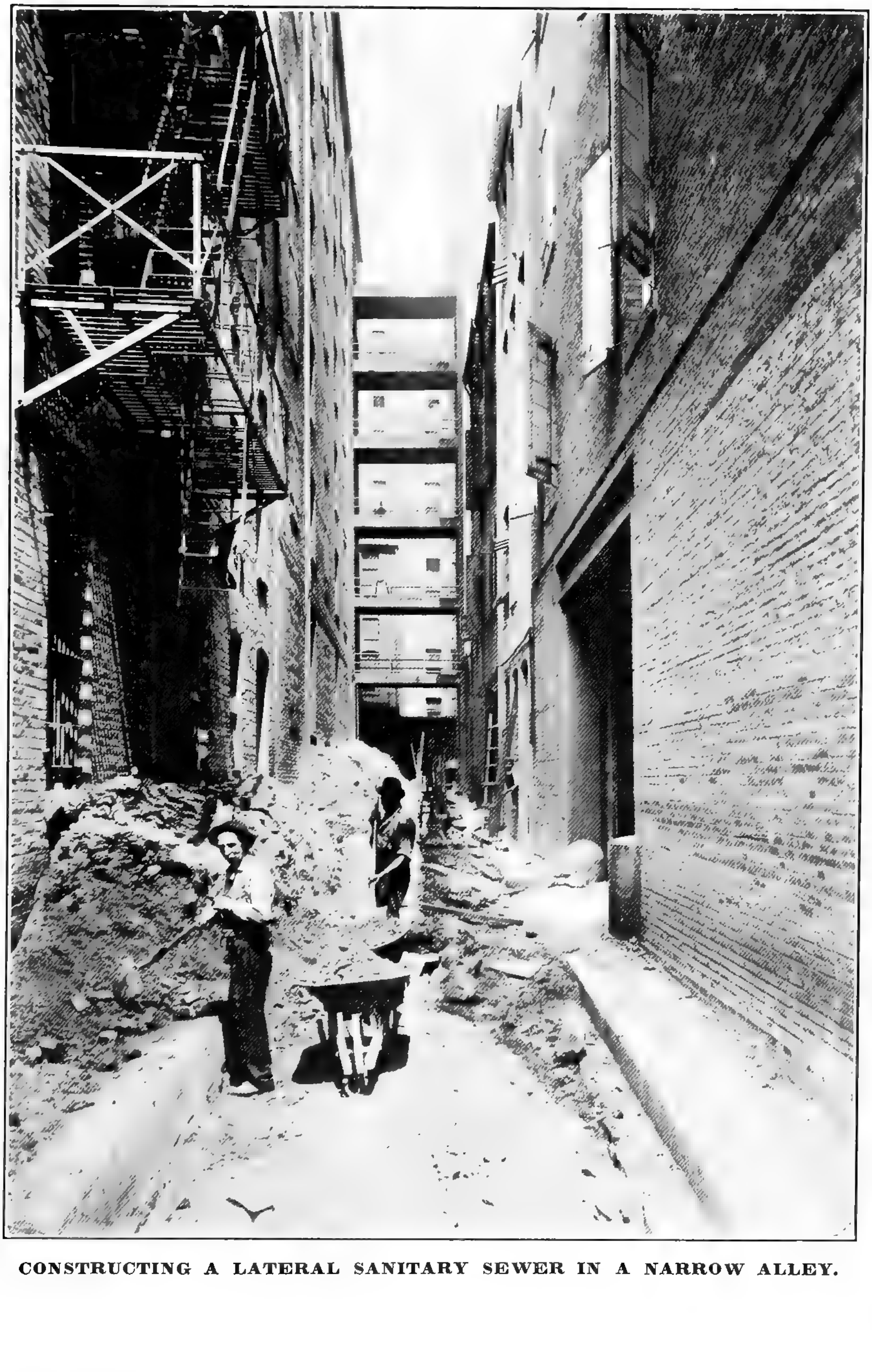
HIGH LEVEL INTERCEPTOR.

Inverted Siphon at Eager Street and Jones' Falls. This Siphon Consists of Two Lines of 42-Inch and One Line of 36-Inch Cast-Iron Pipes. It Passes Under the Railroad Tracks and Is Built into the Top of the Jones' Falls Conduits.



HIGH LEVEL INTERCEPTOR.

Obstructions in Trench at Myrtle Avenue and Waesche Street—Three Private Drains and Two Gas Mains.



CONSTRUCTING A LATERAL SANITARY SEWER IN A NARROW ALLEY.

forming my plans for the Jones Falls construction. The use of this stone has resulted in a large saving to the City.

We hope to have the work completed from a point 175 feet south of Centre street to Baltimore street by June, 1913.

FALLSWAY VIADUCT.

I have about completed plans for the viaduct to carry the roadway from Madison street over the Northern Central tracks, intersecting Eager and Chase streets, and Biddle street at Guilford avenue. This work, however, cannot be put under contract until the conduits in the bed of the Falls, from Madison street to the entrance to the tunnel, are completed. We are, however, proceeding with the construction of the piers for the viaduct that will rest on the roof of the conduits, and on the west side, as the work on the conduits proceeds.

This improvement, in connection with the enclosing of Jones Falls, will be of far-reaching value to the whole City in the increase in taxes, improvement of health and traffic conditions, and will be one of the best business ventures the City has ever entered into.

Another feature of the Jones Falls work, which was started and completed during the year, is the Drift-Catcher, located just south of the Cedar Avenue bridge across the Falls, which will prevent any large floating material from entering the closed part of the Falls.

DISPOSAL PLANT.

When the Commission came into existence, they had funds at their disposal sufficient to complete about one-half of the system, and not knowing whether they would later on have sufficient money to complete the whole system, I designed the Disposal Plant and laid out sufficient sewers to take care of practically one-half the City, so that in case the balance of the money was not forthcoming, the City would have completed the system as far as the money went. The balance of the funds having been secured, however, we have laid out additional units at the Disposal Plant to take care of the City as outlined in our original plans. The contracts for these units amount to $888,322.

Trees have been planted and roads built at the Disposal Plant which, with the electric lights produced by the flow of the sewage, make this improvement one of great attraction. It is well worth a visit from any taxpayer who is interested in the improvement of his City. We are having persons from all parts of the world visit Baltimore for the purpose of inspecting this plant—strangers are more familiar with the work going on in Baltimore than are many of the Baltimoreans.

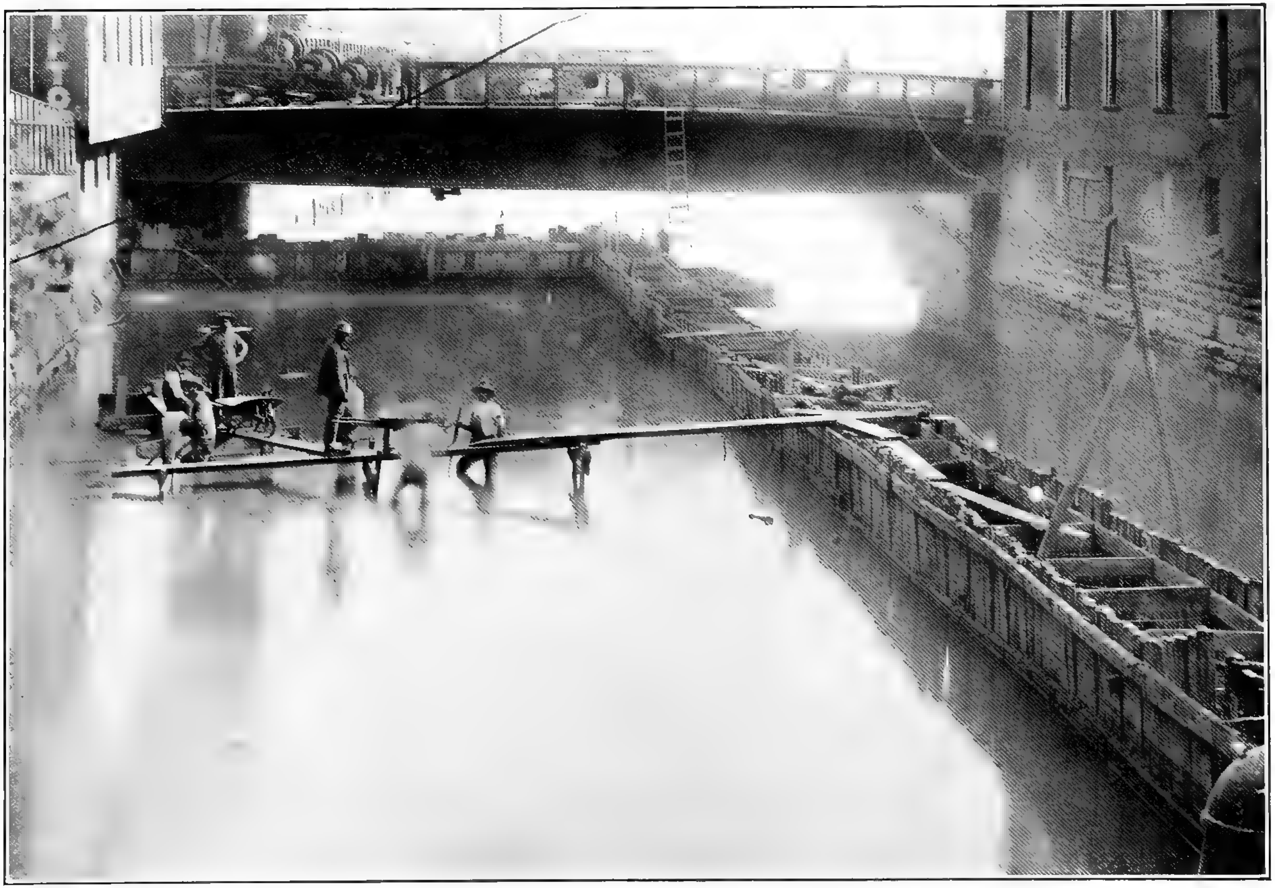
Harbor Odors.

In order to relieve the unbearable odors emanating from the harbor, before the sanitary sewers were completed that would intercept the sewage draining into it, the Commission intercepted the dry weather flow of the main storm-water drains discharging into the harbor, thereby diverting a large amount of sewage from the hotels and big office buildings to the Sewage Pumping Station. In addition, a large amount of the flow of Jones Falls was diverted by pumping it through the Pumping Station to Back River and there purified—resulting in great relief from the odors of the harbor, and statements from the steamboat men that they had not only been relieved of the odors, but that the cost of painting their boats had been materially reduced.

House-Connections.

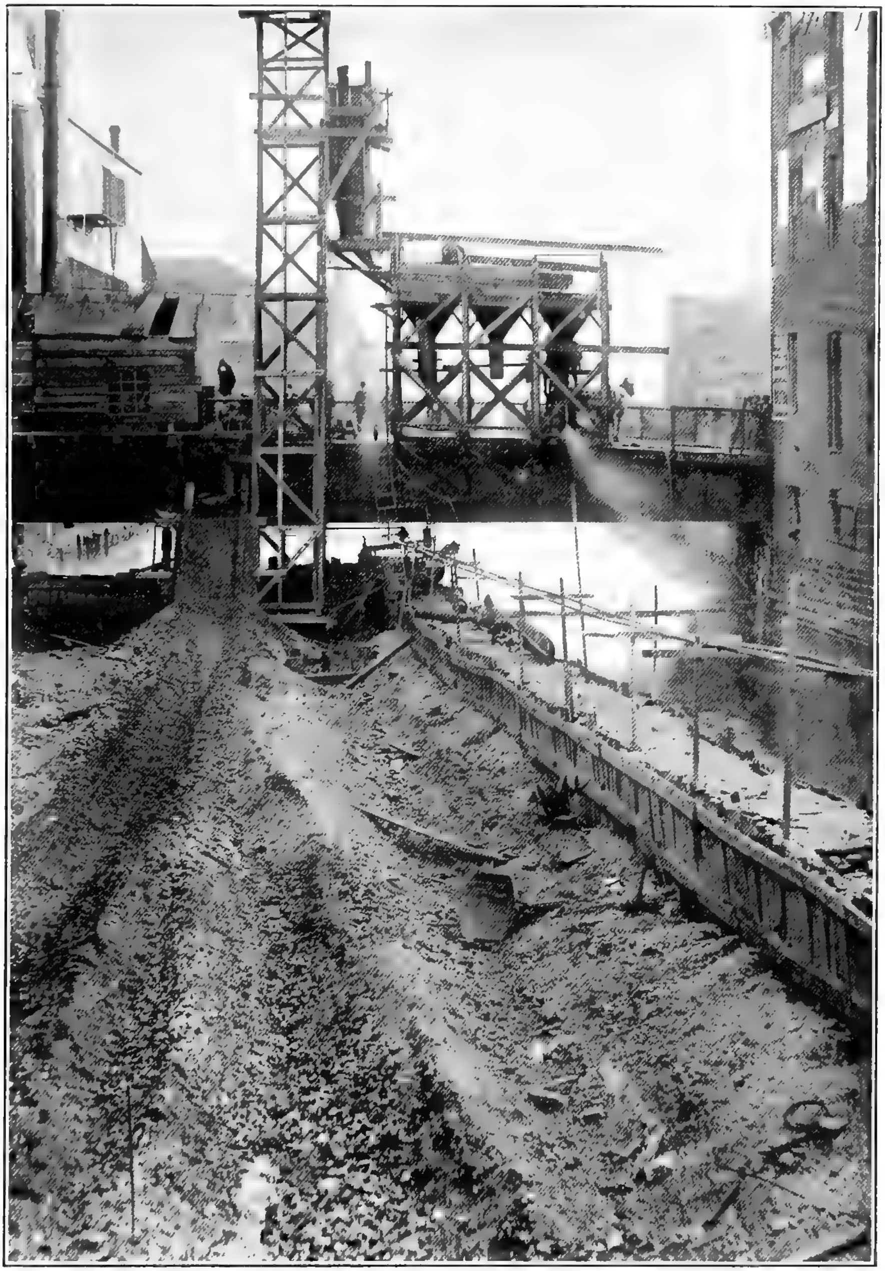
We have turned over to the Health Department over 21,000 houses to have notices sent to connect to the sanitary sewers.

We have laid sewers and drains in portions of over 1,000 streets and alleys. Sanitary sewers have been laid during the



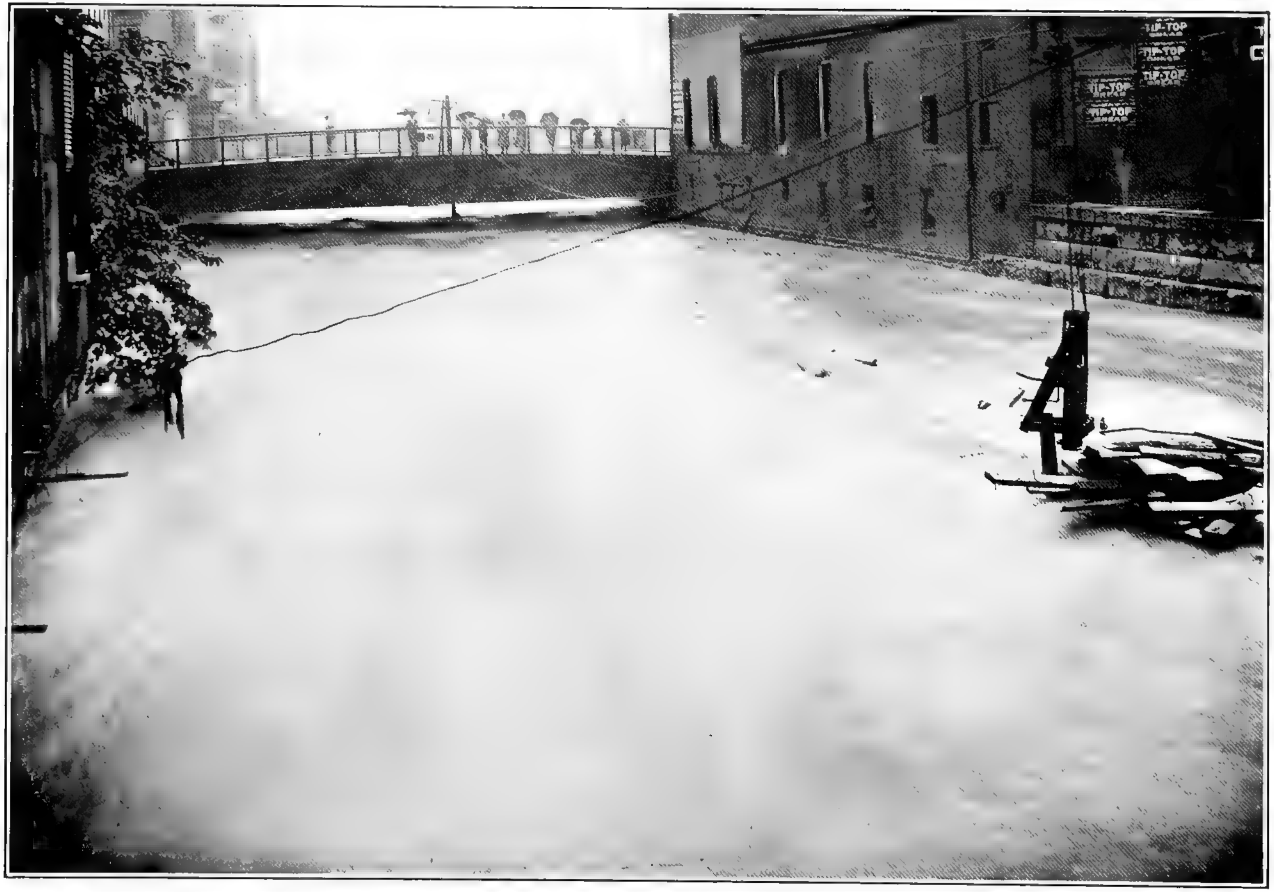
JONES' FALLS CONDUITS, SECTION No. 1.

Looking South from Fayette Street to Baltimore Street; Cofferdam for East Conduit Completed, Ready for Pumping Out.



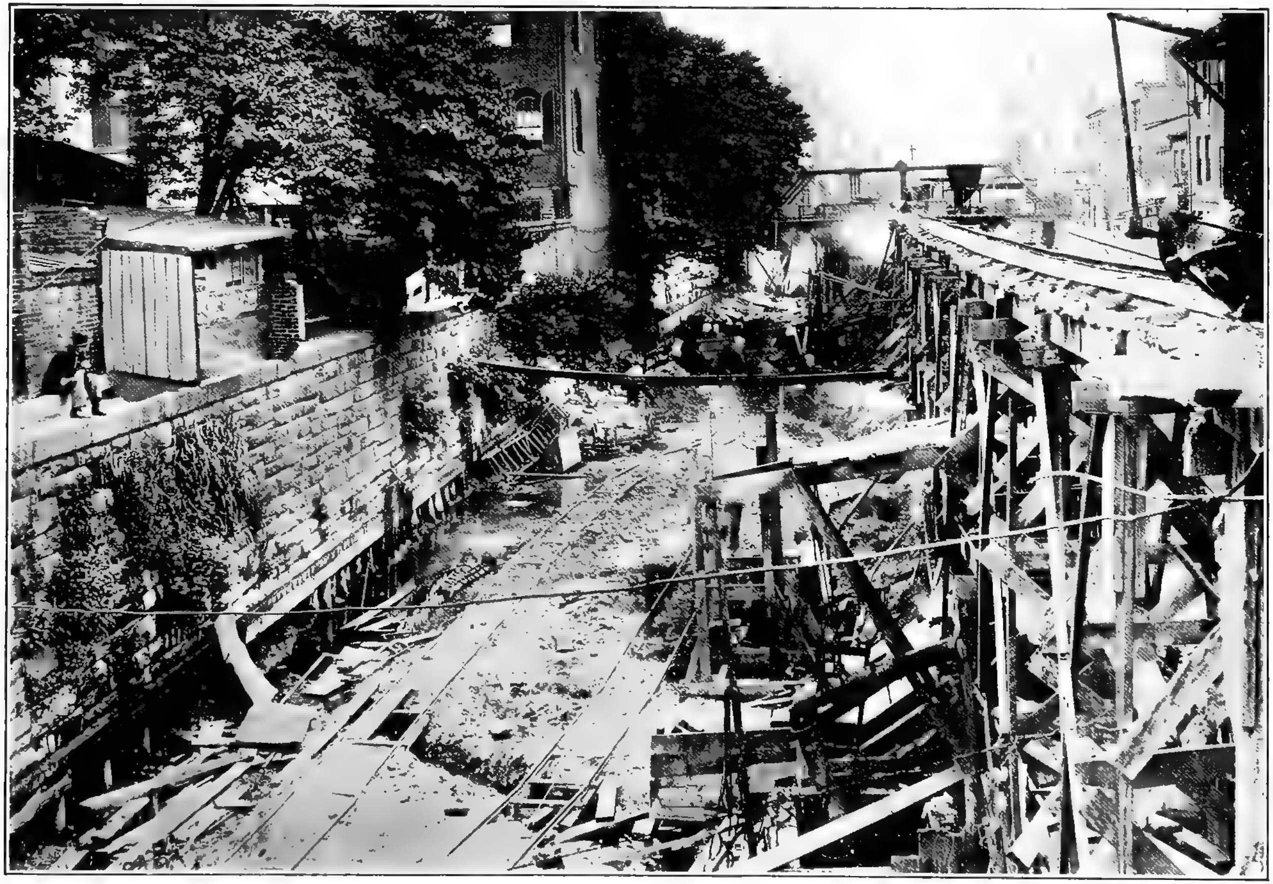
JONES' FALLS CONDUITS, SECTION No. 1.

Looking South from Fayette Street to Baltimore Street; Cofferdam for East Conduit Completed and Excavation in Progress.



JONES' FALLS CONDUITS, SECTION No. 1.

Looking South from Fayette Street to Baltimore Street, Showing High Water During Flood of September 24, 1912.



JONES' FALLS CONDUITS, SECTION No. 1.

Excavation for East Conduit in Progress, Between Lexington and Fayette Streets.

year 1912 in the areas described as follows, and the sanitary system within these areas is practically completed:

Beginning at Pratt and Light streets, to Fayette street, to Calvert street, to Saratoga street, to Charles street, to Pleasant street, to Calvert street, to Jones Falls, to Pratt street, to point of beginning.

Beginning at Lanvale street and Park avenue, to Laurens street, to Linden avenue, to Whitelock street, to Bolton avenue, to Druid Hill Park, to Mount Royal Terrace, to North avenue, to Jones Falls, to Lanvale street, to point of beginning.

Beginning at Fayette and Aisquith streets, to Eager street, to Gay street, to Wolfe street, to Ashland avenue, to Broadway, to Monument street, to Bond street, to Fayette street, to Fairmount avenue, to Broadway, to Pratt street, to Caroline street, to Gough street, to Central avenue, to Fawn street, to High street, to Eastern avenue, to Jones Falls, to Pratt street, to Lloyd street, to Baltimore street, to East street, to Fayette street, to point of beginning.

Beginning at Valley and Twentieth streets, to Hope street, to Lanvale street, to Ensor street, to North avenue, to Valley street, to point of beginning.

Intercepting sanitary sewers have been built in the following streets:

Beginning at Cathedral and Centre streets, to Park avenue, to Mulberry street, to Greene street, to Saratoga street, to Myrtle avenue and Saratoga street.

Eager street, from Calvert street to Buren street.

Beginning at Light and York streets, to Battery avenue, to Hughes street, to Covington and Hughes streets.

In addition to the sewers laid within the above described areas, sewers have been laid in certain other areas and in certain streets and alleys in order to allow us to release streets for paving, as given in the following list. A few short lengths of sewer have been laid in other localities in order to provide connections for new buildings or to meet other conditions which arose during the year; these last mentioned sewers, in all cases, were less than one block in length, and are not included in the following list:

Beginning at Cathedral and Preston streets, to Charles street, to Mount Royal avenue, to Calvert street, to Preston street, to St. Paul street, to Chase street, to Cathedral street, to point of beginning.

Beginning at Warren avenue and Light street, to Covington street, to Grindall street, to Riverside avenue, to Cross street, to Light street, to point of beginning.

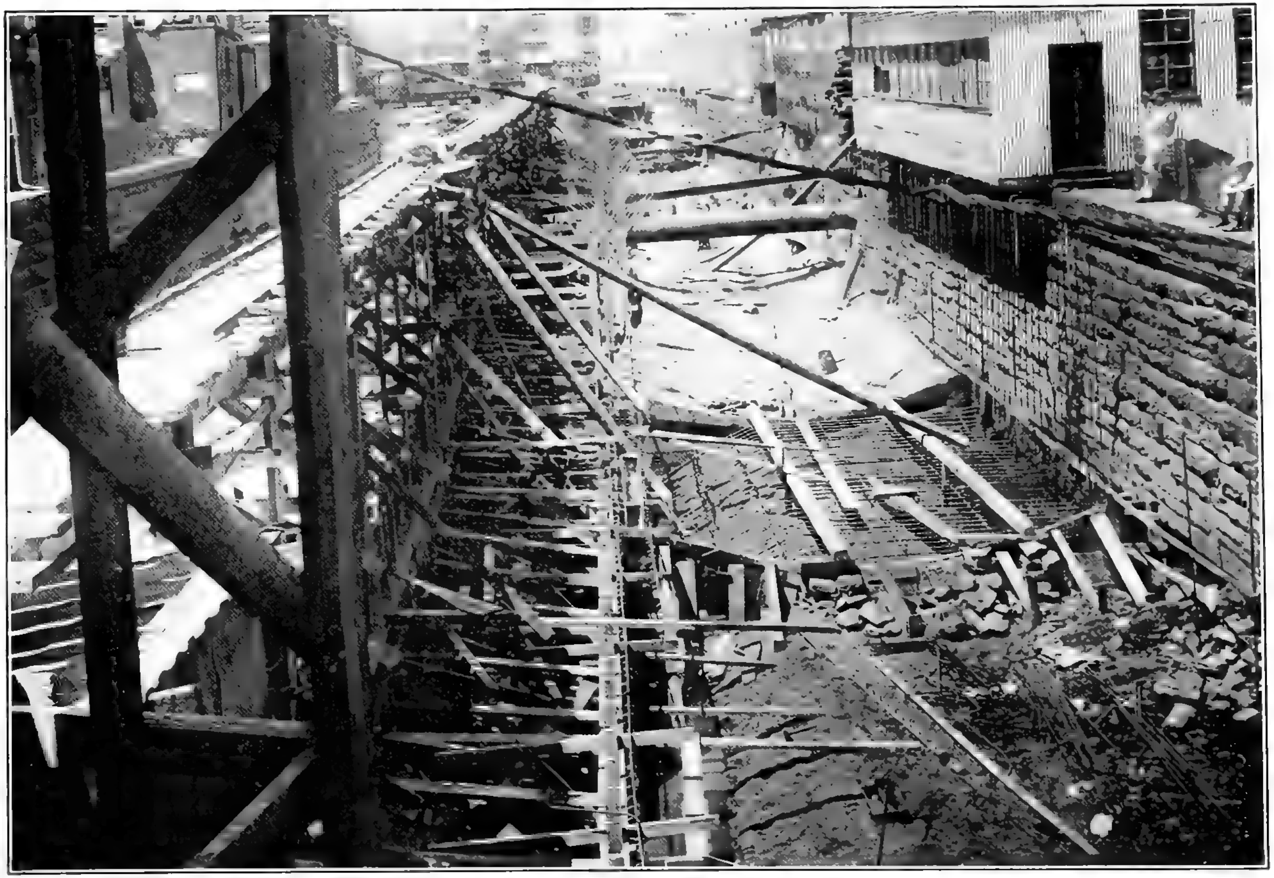
Beginning at William and Cross streets, to Riverside avenue, to Clement street, to William street, to point of beginning.

Dolphin and Oliver streets, from Foster street to a point 200 feet west of Maryland avenue.

Hoffman street, from Eutaw street to Brevard street.
Preston street, from Eutaw street to Brevard street.
Bolton street, from Lafayette avenue to Hoffman street.
Ridgely street, from Ostend street to Fremont avenue.
Eutaw street, from Pratt street to Lee street.
Howard street, from Pratt street to Camden street.
Camden street, from Eutaw street to Howard street.
Dover street, from Eutaw street to Howard street.
Oswego avenue, from Towanda avenue to Reisterstown road.
Reisterstown road, from Oswego avenue to Sixth avenue.
Boarman avenue, from Calloway avenue to Lewin avenue.
Linden avenue, from Dolphin street to Hoffman street.
Linden avenue, from Preston street to Biddle street.

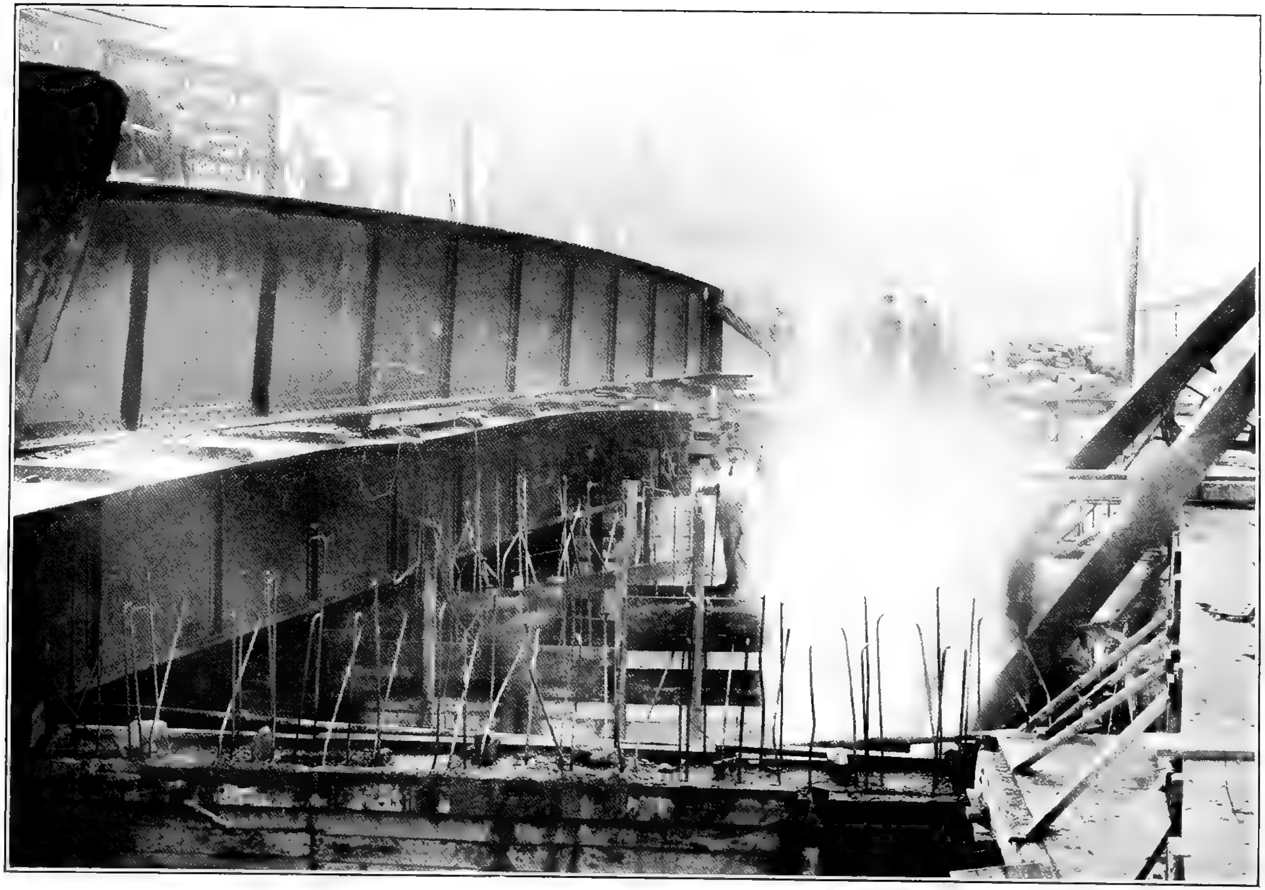
The streets in which storm-water drains have been constructed during the year are as follows:

Fairmount avenue, from Central avenue to Bethel street.
Caroline street, from Fairmount avenue to Fayette street.
Bond street, from Fairmount avenue to Fayette street.
Fayette street, from Central avenue to Eden street.
Fayette street, from Bond street to Broadway.
Wolfe street, from Jefferson street to McElderry street.
McElderry street, from Wolfe street to Chappel street.
McElderry street, from Eden street to Bond street.
Warden street, from Eager street to Chase street.
Chase street, from Warden street to Brentwood avenue.
Brentwood avenue, from Chase street to Biddle street.
Biddle street, from Brentwood avenue to Greenmount avenue.



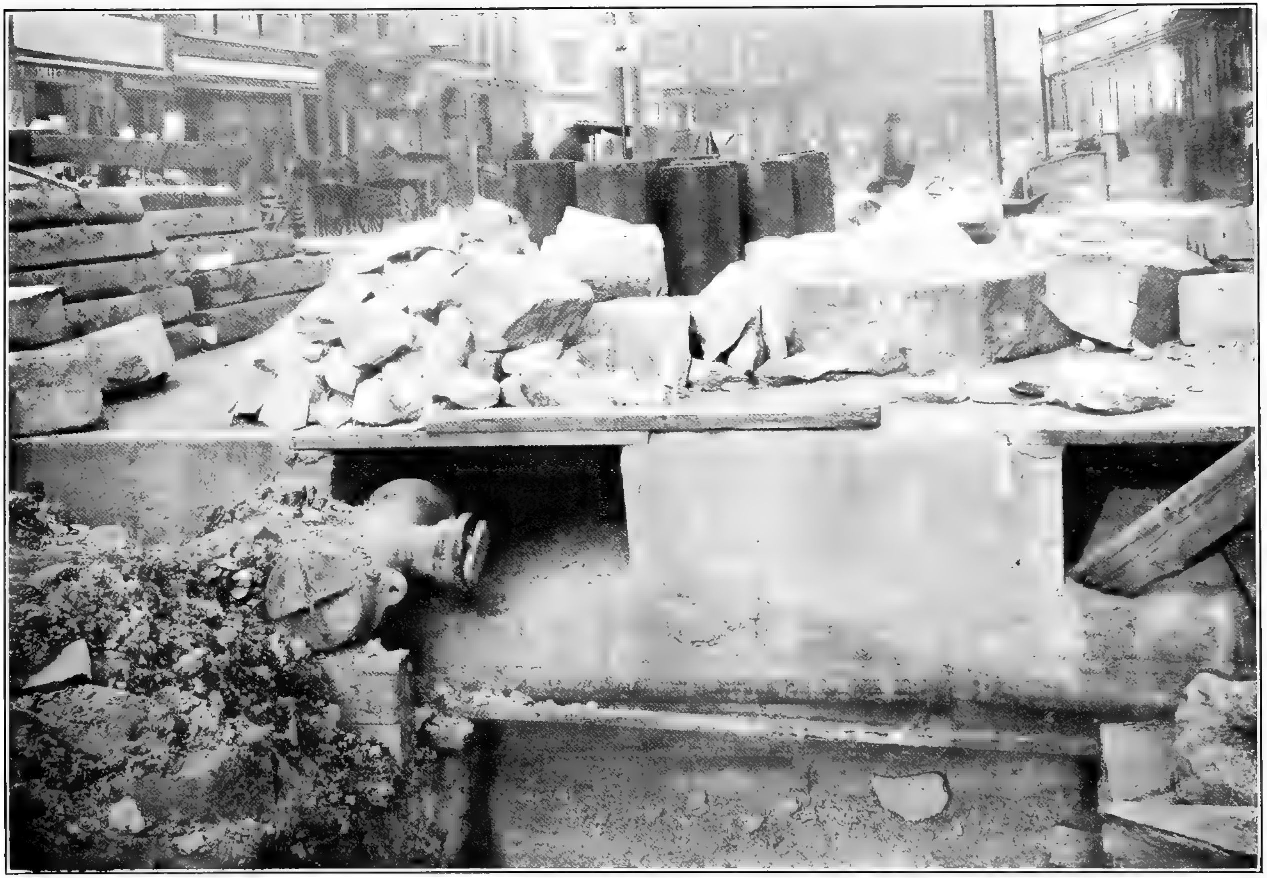
JONES' FALLS CONDUITS, SECTION No. 1.

Looking North from Lexington Street, Showing Progress of Construction of East Conduit.



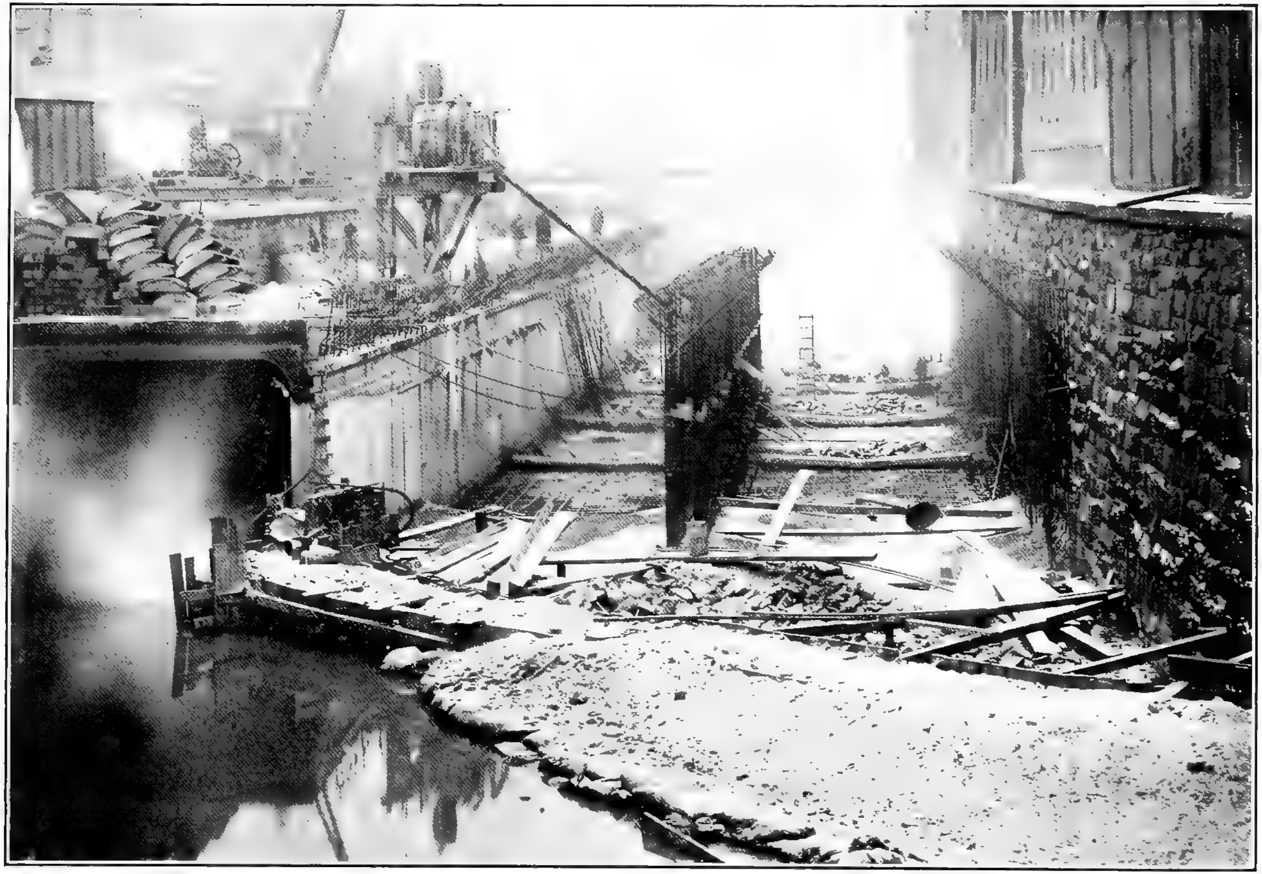
JONES' FALLS CONDUITS, SECTION No. 1.

Removing Girders of Lexington Street Bridge.



JONES' FALLS CONDUITS, SECTION No. 1.

Channels Left in the Top of the Jones' Falls Conduits, at Gay Street, for Subway and Water Departments.

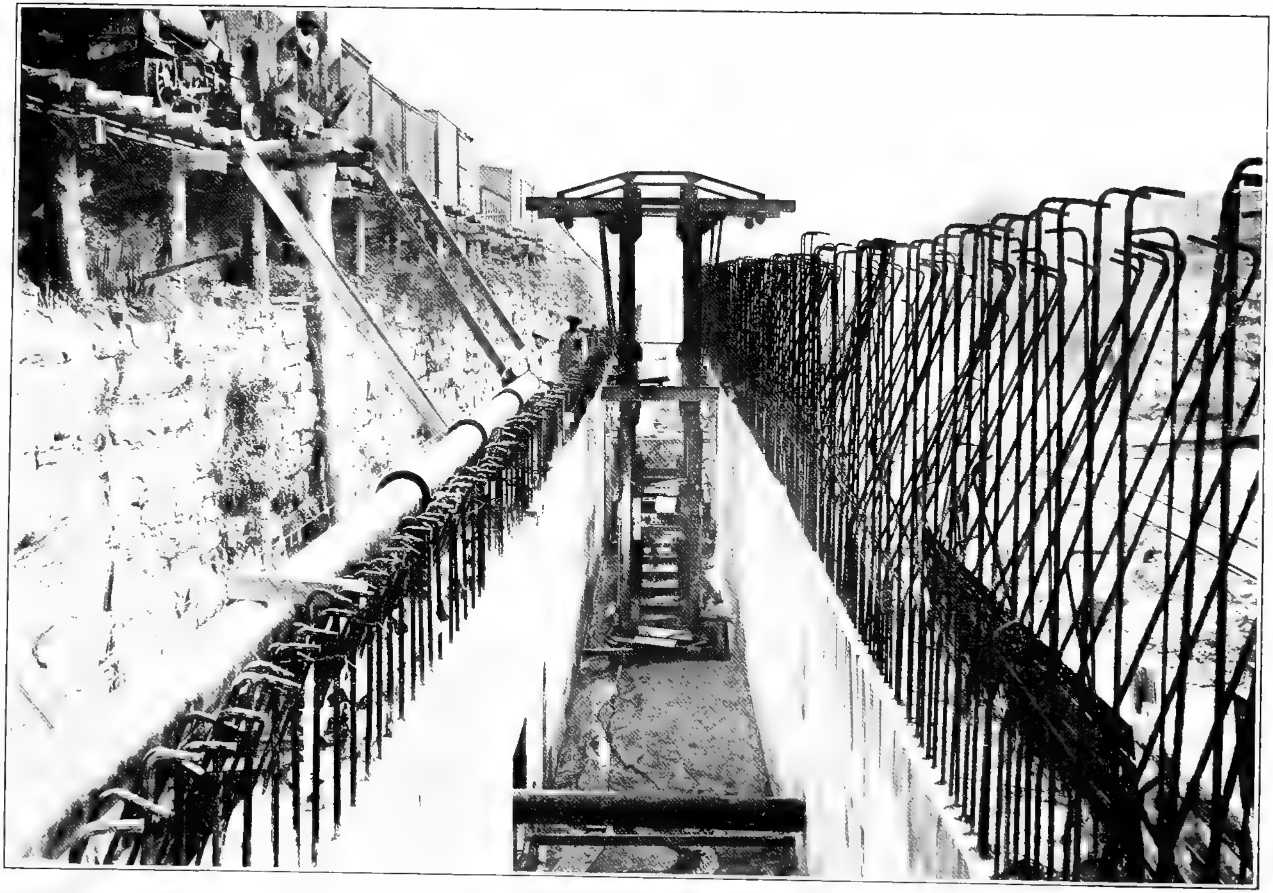


JONES' FALLS CONDUITS, SECTION No. 1.

Looking South from Centre Street, Showing East Conduit Completed and Centre and West Conduits Under Construction.

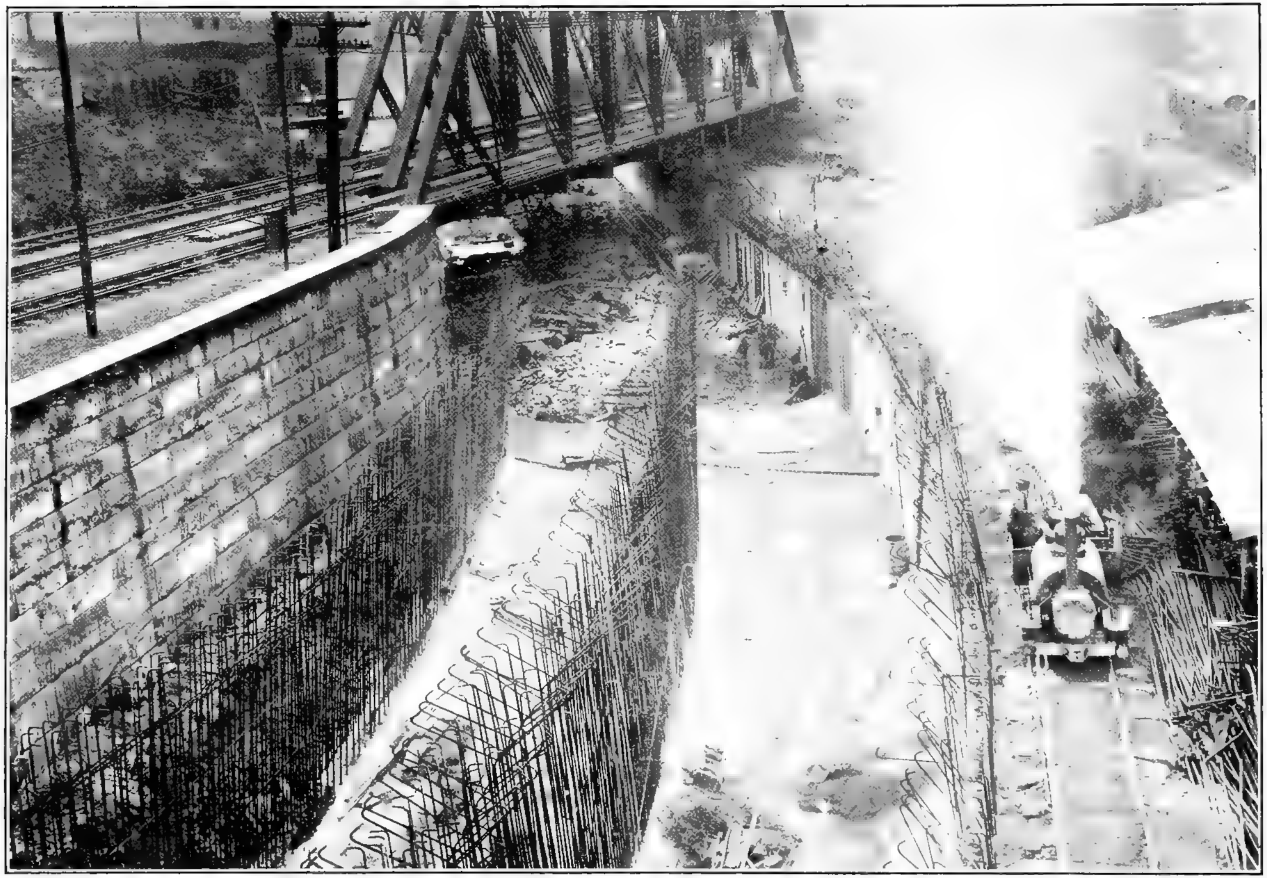
Caroline street, from Ashland avenue to Chase street.
German street, from Arch street to Greene street.
Greene street, from German street to Baltimore street.
Lee street, from Howard street to Sharp street.
Jefferson street, from Somerset street to Central avenue.
Orleans street, from Somerset street to Central avenue.
Jefferson street, from Eden street to Ann street.
Oliver street, from Lamont street to Caroline street.
Caroline street, from Oliver street to Federal street.
Oliver street, from Wolfe street to west side of Broadway.
Intersection of Washington street and Eager street.
Intersection of Brentwood avenue and Eager street.
Intersection of Forrest street and Eager street.
McDonogh street, from Eager street to Barnes street.
Fayette street, from High street to East street.
Wolfe street, Eager street to Madison street.
Ashland avenue, from Wolfe street to Washington street.
Intersection of Fayette street and Arch street.
Intersection of Raborg street and Arch street.
Intersection of German street and Arch street.
Intersection of Durham street and Eager street.
Intersection of Castle street and Eager street.
Bond street, from Hoffman street to Federal street.
McMechen street, from Druid Hill avenue to Madison avenue.
Fairmount avenue, from Collington avenue to Montford avenue.
Montford avenue, from Fairmount avenue to Fayette street.
Intersection of Pine street and Pin alley.
Intersection of Pine street and Melrose alley.
Intersection of Luzerne street and Monument street.
Intersection of Pine street and Saratoga street.
Intersection of Pine street and German street.
Intersection of Pine street and Lexington street.
Intersection of Pine street and Fayette street.
Intersection of Pine street and Raborg street.
Intersection of Pine street and Baltimore street.
Sharp street, from Stockholm street to Henrietta street.
West street, from Race street to Patapsco street.
Lee street, from Hanover street to Light street.
Heath street, from Race street to Light street.
Clarkson street, from Barney street to Heath street.
Barney street, from Clarkson street to Johnson street.
Charles street, from Heath street to Randall street.

Gwynn's Falls Park and Chestnut road.
Randall street, from Charles street to Battery avenue.
Granby street, from East Falls avenue to High street.
Fort avenue, from Light street to Battery avenue.
Jordan alley, from Robert street to Laurens street.
Federal street, from Guilford avenue to Barclay street.
Oliver street, from Latrobe street to Carter street.
Greenmount avenue, from Cemtery Gate to Belvedere street.
Preston street, from Greenmount avenue to Homewood avenue.
Greenmount avenue, from Preston street to Hoffman street.
Fort avenue, from Lowman street to Haubert street.
Woodall street, from Fort avenue to Clement street.
Clement street, from Towson street to Andre street.
Andre street, from Fort avenue to Clement street.
Hamburg street, from Light street to William street.
Fort avenue and Charles street.
Fort avenue and Patapsco street.
Fort avenue and Hanover street.
Fort avenue and Olive street.
Fort avenue and Marshall street.
Granby street and Exeter street.
Hanover street, from Winder street to McComas street.
Hanover street, from Moale street to waterfront.
Cromwell street, from Charles street to Hanover street.
Kelso street, from Marshall street to waterfront.
Castle street, from Bank street to harbor.
Intersection of Aliceanna street and Chester street.
Longwood street, from Stafford street to Frederick road.
Frederick road, from Longwood street to P., B. & W. R. R.
Frederick road, from Hurley's lane to Gwynn's Falls.
Frederick avenue, from Gwynn's Run to Smallwood street.
Lanvale street, from Pennsylvania avenue to Argyle avenue.
Argyle avenue, from Lanvale street to Mosher street.
Lafayette avenue, from Argyle avenue to Myrtle avenue.
Lafayette avenue, from Eutaw Place to Linden avenue.
Linden avenue, from Lafayette avenue to Mosher street.
Mosher street, from Eutaw Place to Bolton street.
Morris alley, from Lafayette avenue to McMechen street.
McMechen street, from Madison avenue to Eutaw Place.
Linwood avenue, from Lombard street to McElderry street.
Ensor street, from Monument street to Ashland avenue.
Preston street, from Ensor street to Harford avenue.



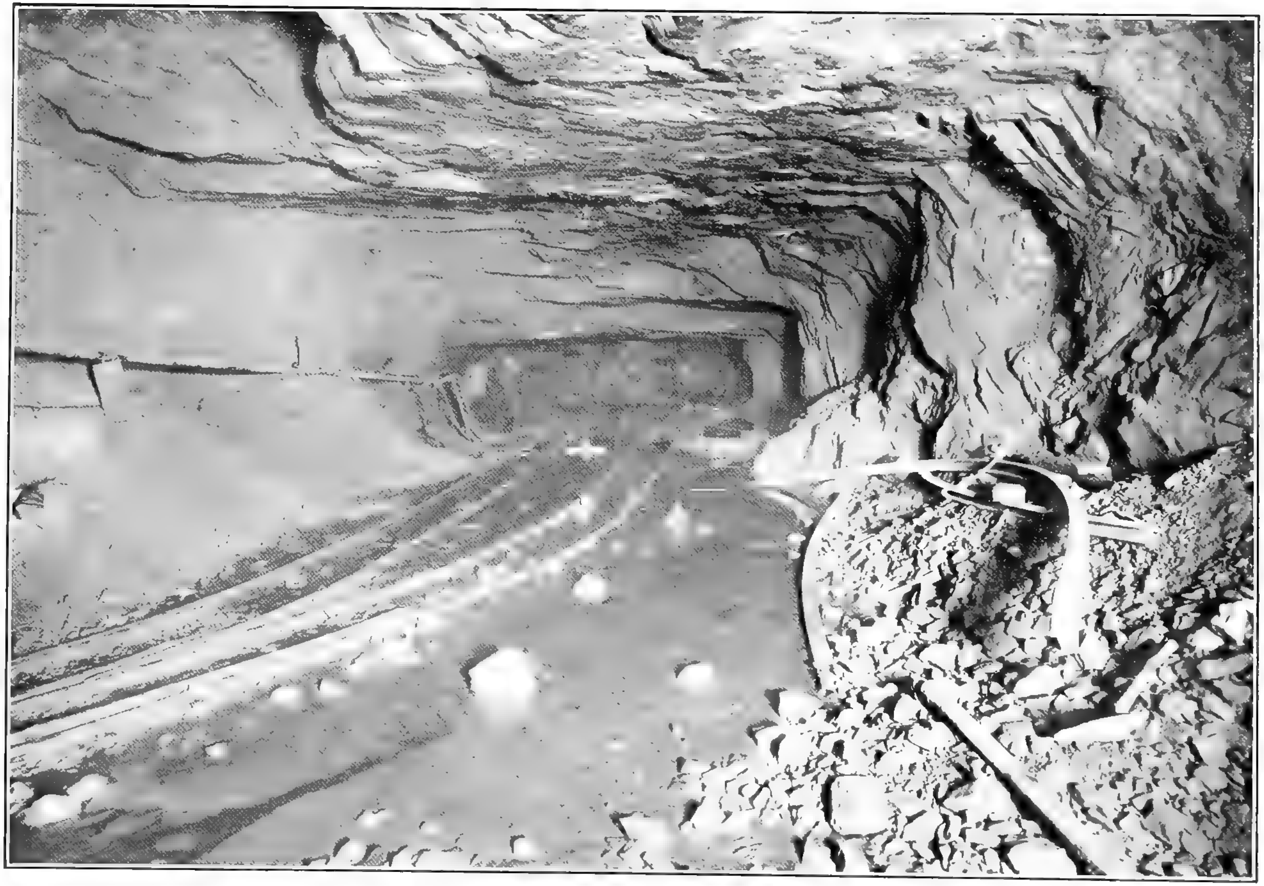
JONES' FALLS CONDUITS, SECTION No. 2.

Contracted Section of East Conduit, South of Eager Street, Showing Bottom and Sidewall Completed and Ready for Roof, with Traveler Used for Moving Forms.



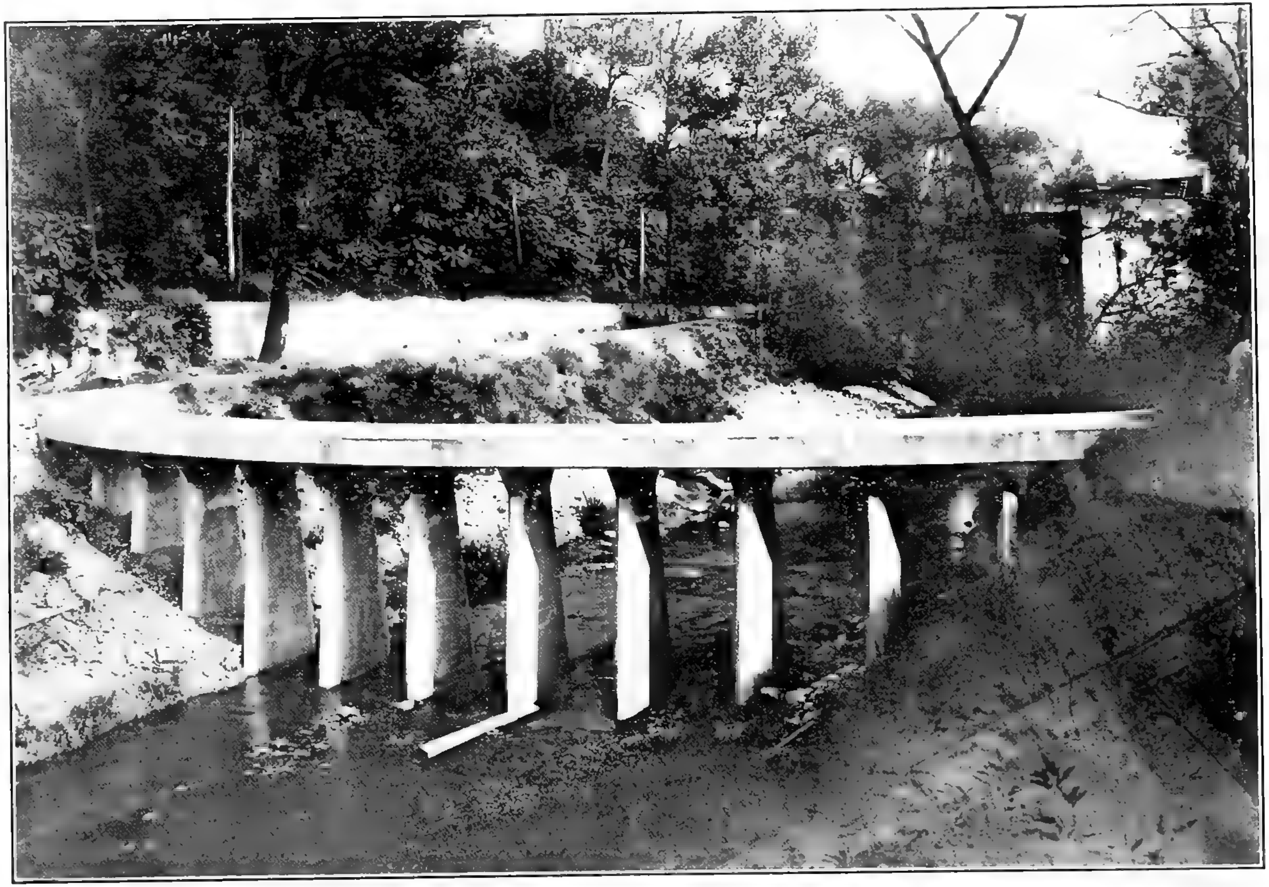
JONES' FALLS CONDUITS, SECTION No. 2.

Looking North from Eager Street, Showing Progress.



JONES' FALLS CONDUITS, SECTION No. 2.

Heading of Tunnel Under the Intersection of Preston Street and Guilford Avenue.



JONES' FALLS CONDUITS, SECTION No. 2.

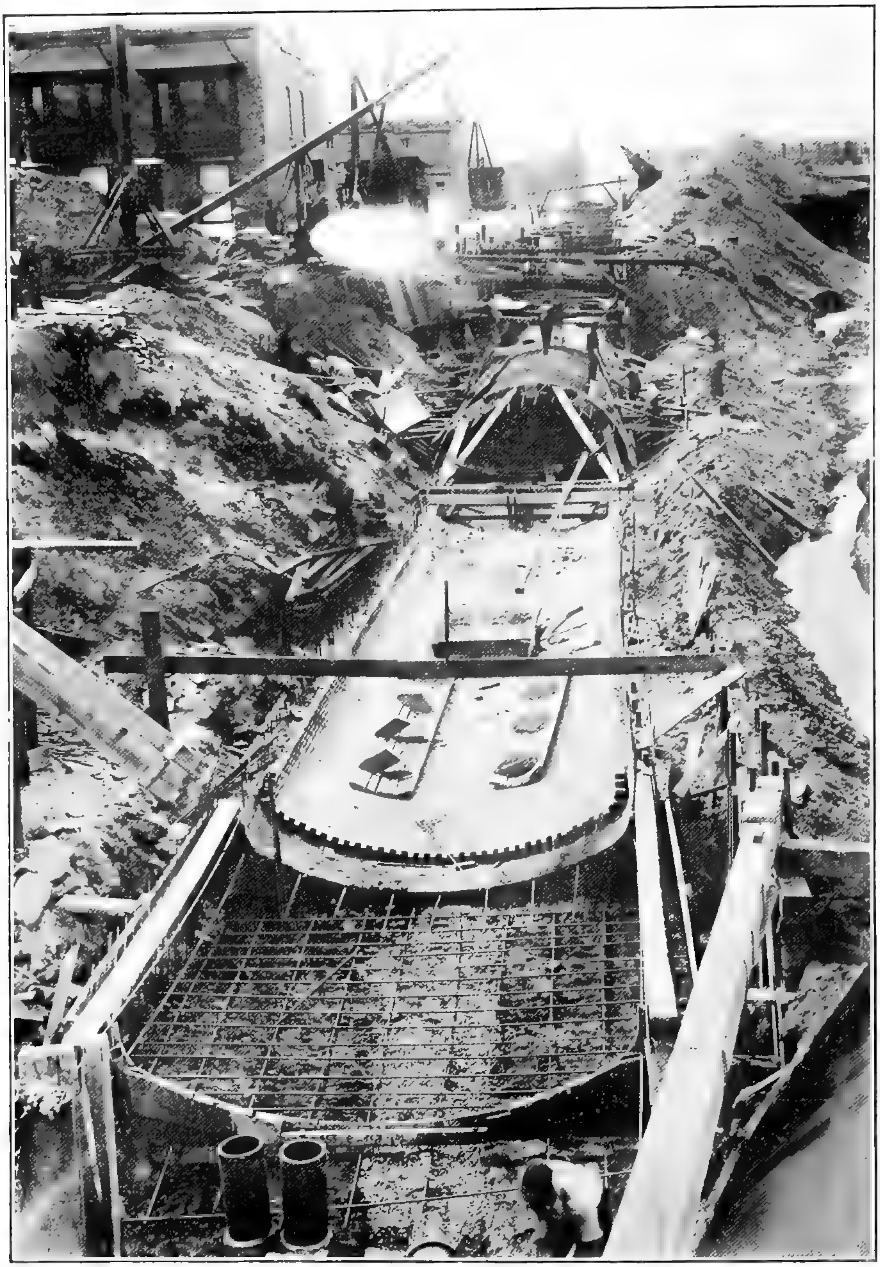
Drift-Catcher Across Jones' Falls at Rock Mill. This Structure Is Intended to Catch Heavy Drift (Trees, Buildings, etc.) and Prevent It from Being Carried into the Jones' Falls Conduits Further Down the Stream.

Eager street, from Valley street to Stirling street.
Chestnut street, from Gay street to Low street.
Intersection of Monument street and Graves street.
Intersection of Constitution street and Monument street.
Hillen street, from Jones Falls to Colvin street.
Aisquith street, from Low street to Monument street.
High street, from Low street to Gay street.
West side of Forrest street, from Ensor street to Hillen street.
Fayette street, from Collington avenue to Patterson Park avenue.
Front street, from High street to Exeter street.
Fayette street, from Wolfe street to Chester street.
Roland avenue, from Thirty-sixth street southward about 900 feet.
Madison street, from Washington street to Chester street.
Barre street, from Hanover street to Light street.
Conway street, from Hanover street to Light street.
Intersection of Camden street and Charles street.
Greenmount avenue, from Lanvale street to 250 feet north of Lafayette avenue.
Springdale avenue, from Thirteenth street to Fourteenth street.
Fourteenth street, from Springdale avenue to alley north of Springdale avenue.
Alley north of Springdale avenue, from Fourteenth street to alley west of Fourteenth street.
Beech avenue, from Ninth street to Tenth street.
Tenth street, from Beech avenue to Piedmont avenue.
Piedmont avenue, from Tenth street to point 200 feet west thereof.
Mulberry street, from Smallwood street to Payson street.
Monroe street, from Mulberry street to Penrose avenue.
Saratoga street, from Smallwood street to Monroe street.
Lexington street, from Wheeler street to Payson street.
Smallwood street, from Lexington street to Penrose avenue.
Penrose avenue, from Smallwood street to Bentalou street.
Bentalou street, from Penrose avenue to Lexington street.
Wheeler street, from Lexington street to alley south of Lexington street.
Alley south of Lexington street, from Wheeler street to Gwynn's Run.
Orem avenue, from Pennsylvania avenue to Parkwood avenue.
Morris avenue, from Orem avenue to Whittier avenue.
Whittier avenue, from Morris avenue to alley west of Auchentoroly Terrace.
Alley west of Auchentoroly Terrace, from Whittier avenue to Mondawmin avenue.

Hoffman street, from Linden avenue to Mason alley.
Lanvale street, from Linden avenue to Bolton street.
Mosher street, from Bolton street to Park avenue.
Lombard street, from Jones Falls to Exeter street.
Exeter street, from Lombard street to Baltimore street.
High street, from Lombard street to Watson street.
Polk street, from 400 feet south of Gorsuch avenue to Abbottston street.
Abbottston street, from Polk street to 250 feet east thereof.
Carswell street, from Polk street to 250 feet east thereof.
Alley south of Carswell street, from Polk street to 250 feet east thereof.
Alley south of Gorsuch avenue, from Polk street to Van Buren street.
Van Buren street, from alley south of Gorsuch avenue to Gorsuch avenue.
Gorsuch avenue, from Van Buren street to Kennedy avenue.
Kennedy avenue, from Gorsuch avenue to Abbottston street.
Carswell street, from Kennedy avenue to 120 feet east thereof.
Abbottston street, from Kennedy avenue to 175 feet east thereof.
Brook's lane, from Morris alley to Madison avenue.
Appleton street, from Presstman street to Baker street.
Hargrove alley, from Twenty-eighth street to 100 feet south thereof.
Twenty-second street, from Taylor street to Jenkin Run Drain.
Lafayette avenue, from Greenmount avenue to Barclay street.
Lafayette avenue, from Lovegrove alley to Calvert street.
Barclay street, from Lafayette avenue to North avenue.
Terminal street, from Courtney street to Jones Falls.
Carey street, from Cleaveland street to Columbia avenue.
Hill street, from Sharp street to Hanover street.
William street, from Warren avenue to Hamburg street.
Battery avenue, from Warren avenue to Hamburg street.
Ensor street, from Ashland avenue to Well street.
Intersection of Monument street and Buren street.
Intersection of Ensor street and Forrest street.
Caroline street, from Ashland avenue to Gay street.
Fayette street, from Greene street to Arch street.
Intersection of West street and Wall street.
Intersection of West street and William street.
Intersection of West street and Battery avenue.
William street, from Montgomery street to harbor.
Battery avenue, from Montgomery street to harbor.
Intersection of Springdale avenue and Twelfth street.

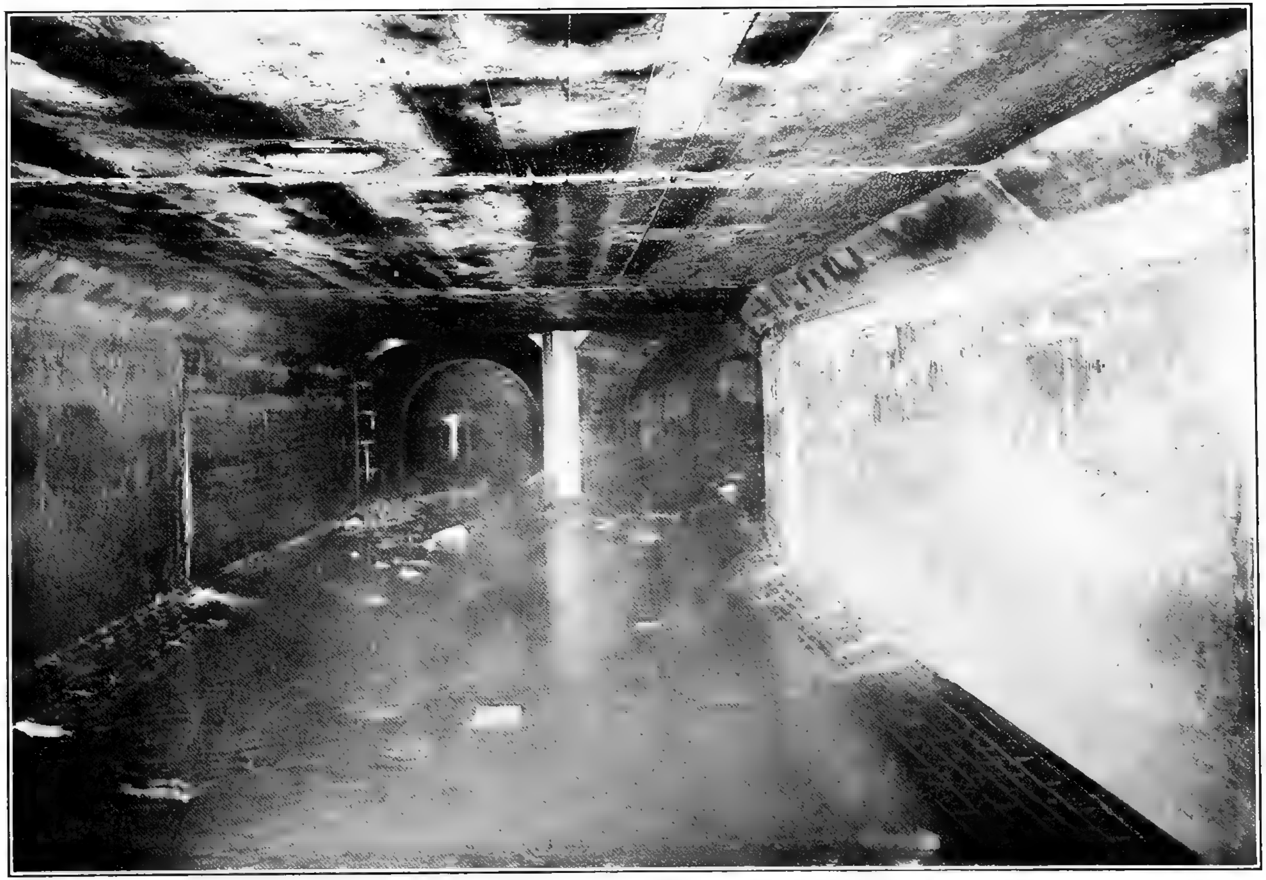
REINFORCED CONCRETE STORM-WATER DRAIN UNDER CONSTRUCTION.

This Drain Is Five Feet Nine Inches Wide by Three Feet High, and Passes Through Canning Factory of D. E. Foote, Castle Street, South of Aliceanna Street.



PECK'S RUN STORM-WATER DRAIN IN SMALLWOOD STREET, SOUTH OF FRANKLIN STREET, UNDER CONSTRUCTION.

This Drain Is Constructed of Reinforced Concrete and Brick and is 138 Inches Wide and 99 Inches High.



JENKINS' RUN STORM-WATER DRAIN.

Diversion Chamber Under Greenmount Avenue, South of North Avenue, Looking West. The Drain to the Left Is the New Drain Running South in Greenmount Avenue; that to the Right Is the Connection to the Old Carter Alley Drain.

Intersection of Springdale avenue and Thirteenth street.
Intersection of Springdale avenue and Fourteenth street.
Intersection of Guilford avenue and Twenty-fourth street.
Intersection of Barclay street and Twenty-fourth street.
Intersection of Barclay street and Twenty-third street.

COMMENTS.

In regard to our storm-water and sanitary construction, the work of prosecuting contracts already let, designing and planning new contracts, and letting them, has been pushed forward in a very satisfactory manner.

Few people realize the magnitude of the work, the difficulties encountered, and the vast amount of details necessary to design and build two systems, one sanitary and one storm-water, covering such a large area, over hills and valleys, through narrow alleys filled with leaking sewers and surface drainage and lined by very old houses, whose foundations, in many cases, are only 18 inches below the surface of the ground; and at the same time to maintain these underground structures in operation, and keep the thoroughfares open, allowing pedestrian, vehicular and street car traffic to be maintained.

The designing and executing of a piece of work of this kind involves very great care on the part of everyone connected with it. There could hardly be better evidence of the efficiency of the engineers and inspectors than the fact that such a large amount of work of this kind has been done in one year, with but a small amount of complaint. In many of the cases reported it was found that there was no cause for complaint, as far as the Sewerage Commission's work was concerned.

Many thousands of dollars have been saved the City on account of the information placed on our contract drawings.

The tables and maps enclosed herewith describe more fully and in detail the work of the Commission.

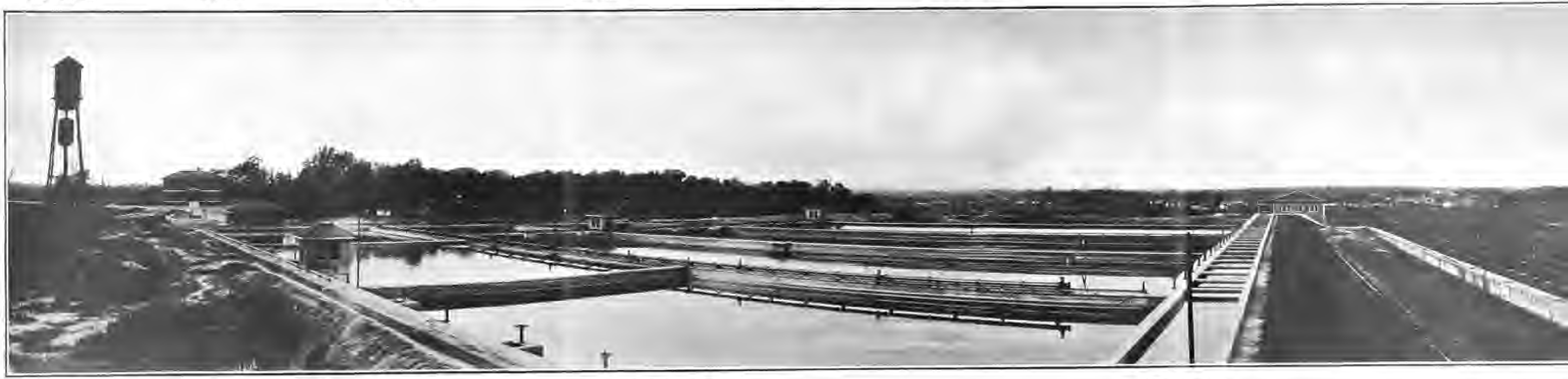
By next year, the time originally stated, I hope to have under contract all of the work outlined in our original plans. However, on account of discounts and certain additional work imposed on us by the Legislature, our funds have been depleted to the extent that we will not be able to cover quite as much territory as originally contemplated.

The Commission, as well as myself, feel that the assistance of Mayor Preston has been of great aid to us in prosecuting our work.

Although my force is practically a new one from the one we started with, on account of men receiving better offers from other places, widely scattered, the present force is working as a unit and deserves great credit for their loyalty and untiring efforts.

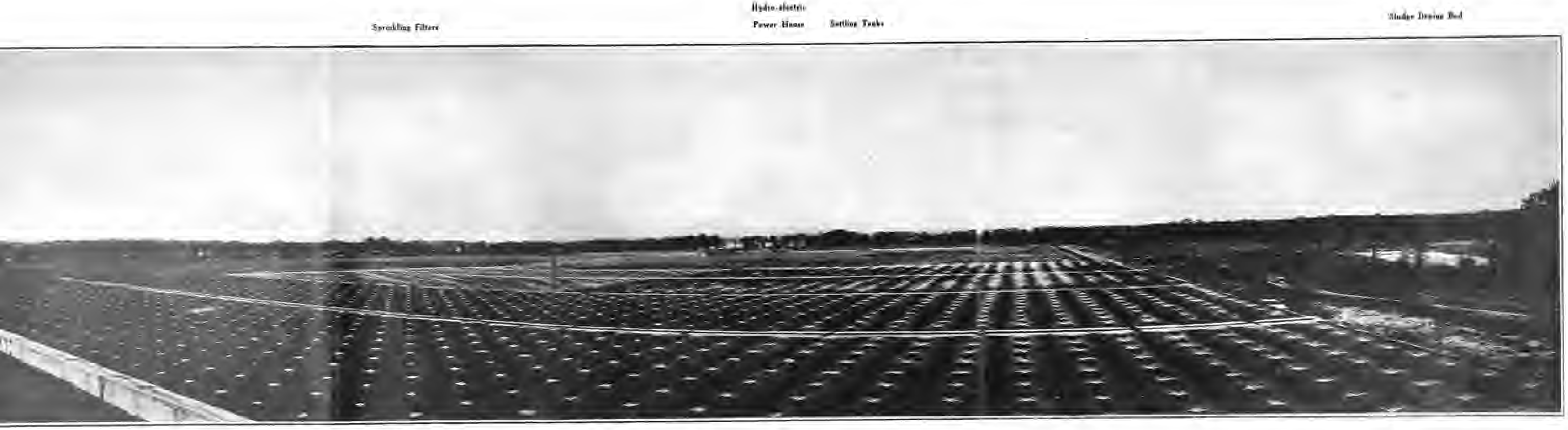
Respectfully submitted,

CALVIN W. HENDRICK,
Chief Engineer.

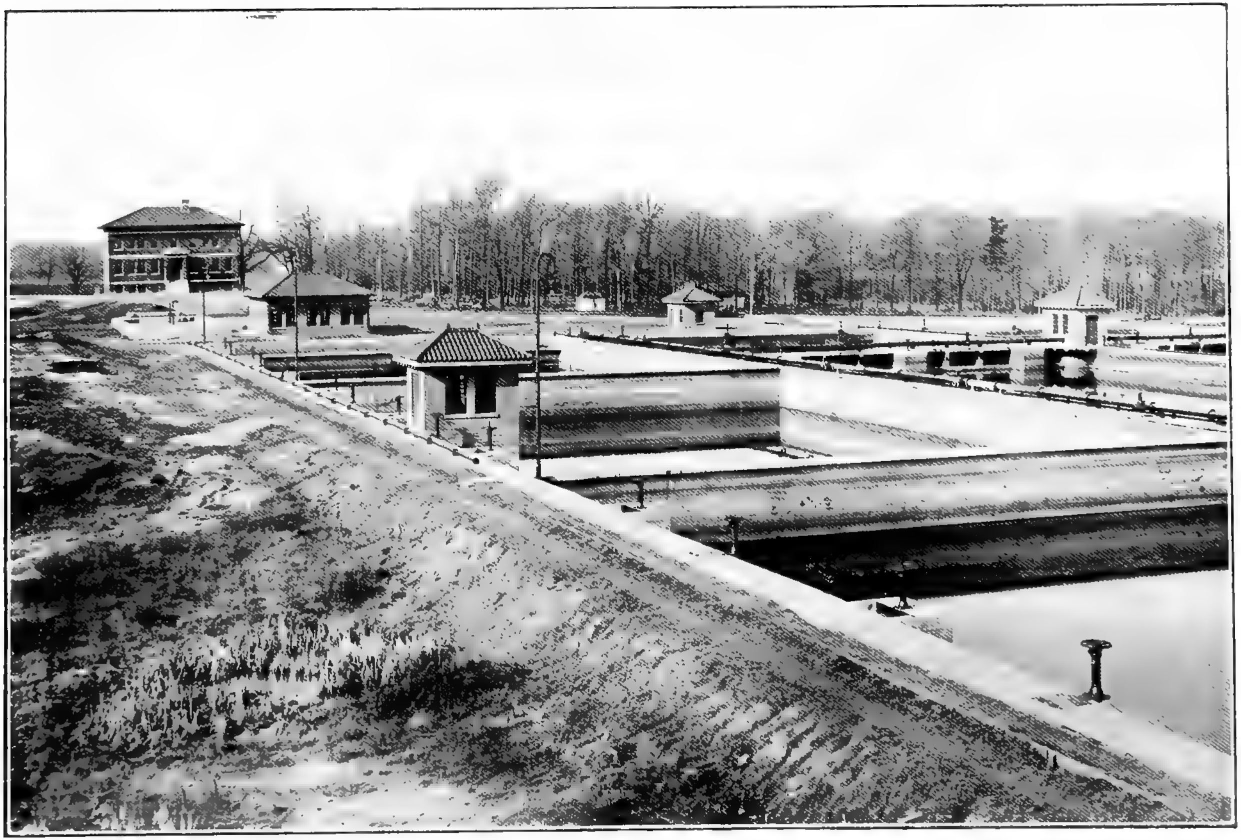


Copyright, 1913, by Fred W. Mueller
631 Ashland Ave., Baltimore, Md.

PANORAMIC VIEW OF THE SEWAGE

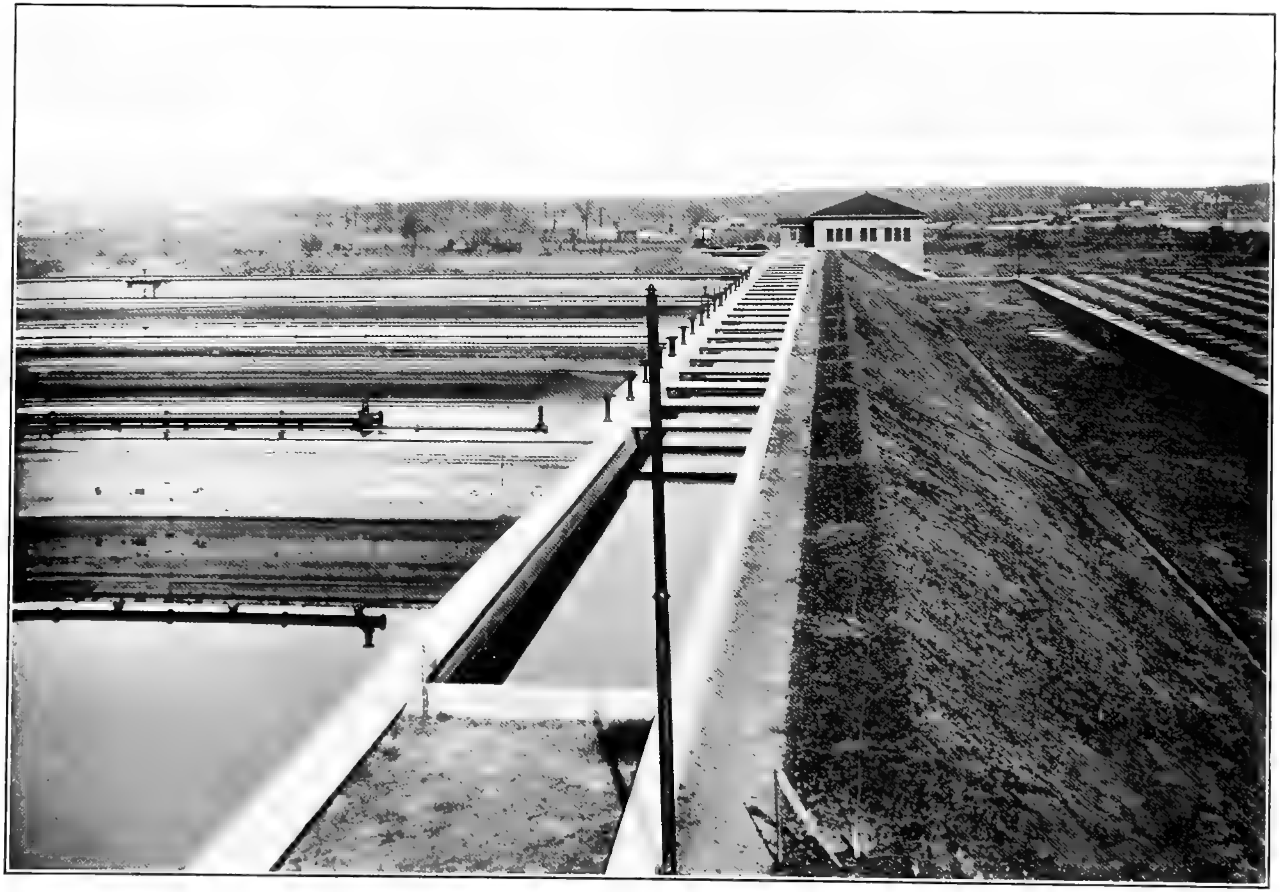


SEWAGE DISPOSAL PLANT



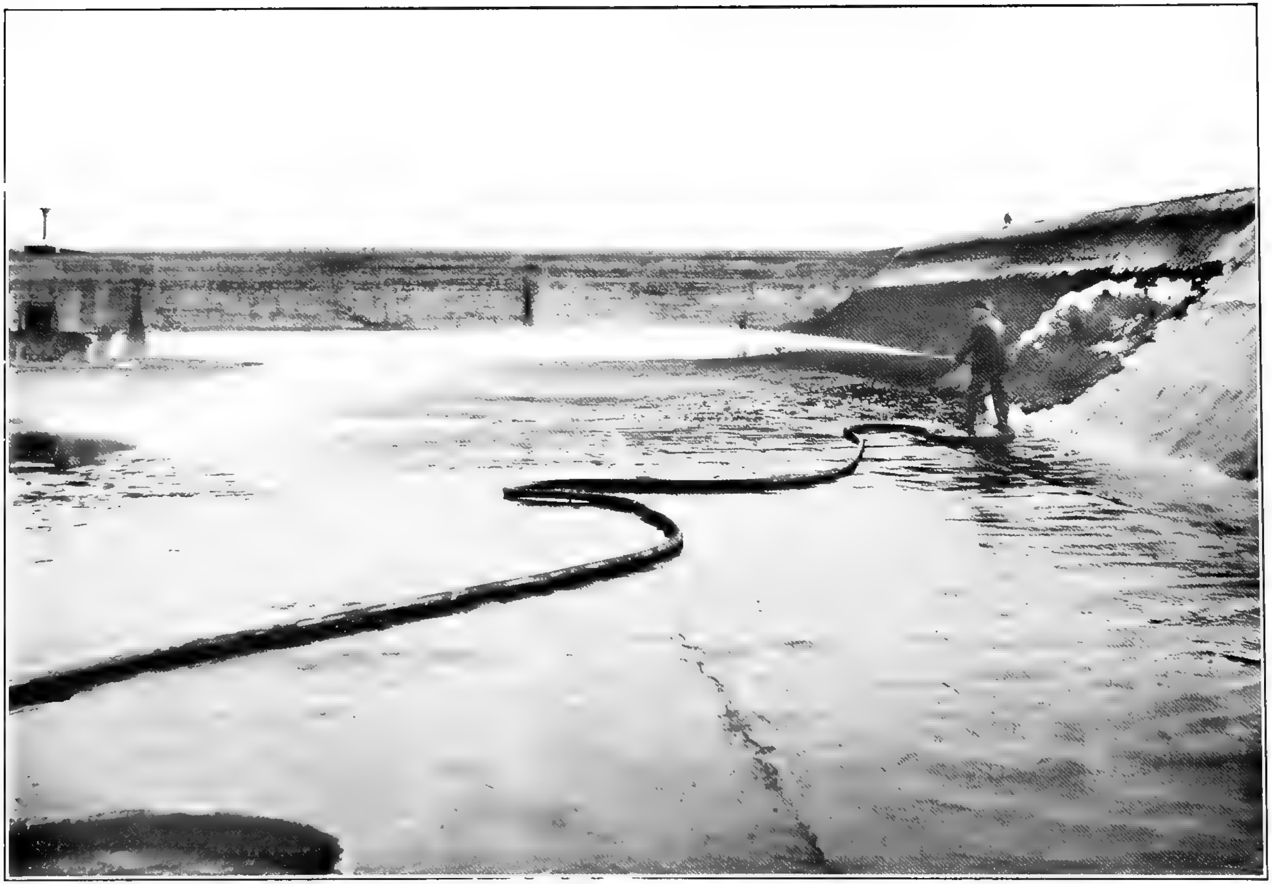
SEWAGE DISPOSAL WORKS.

Sludge-Digesting Tanks. Looking Toward Laboratory and Meter House.



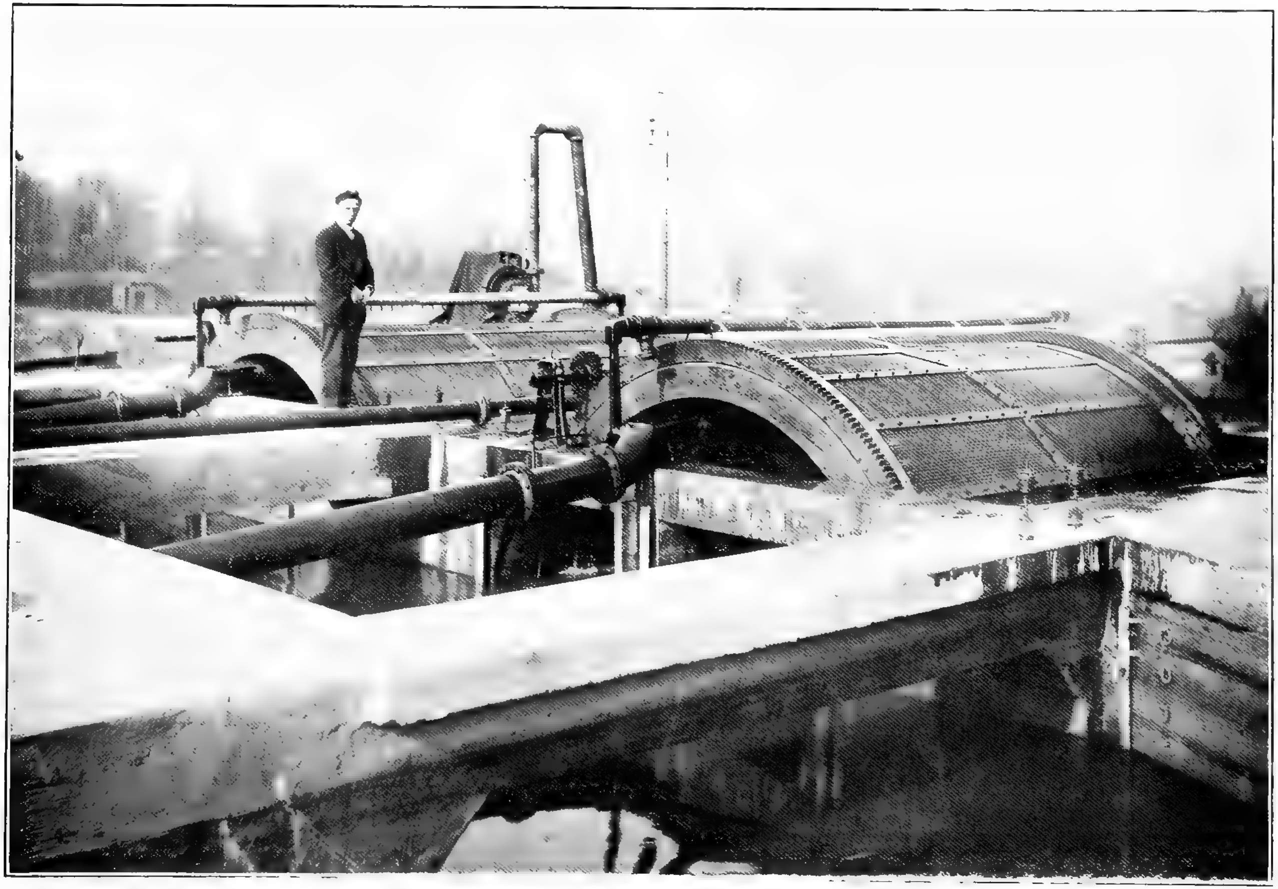
SEWAGE DISPOSAL WORKS.

Outlet Channel from Hydrolitic Tanks to Control House. One of the Sludge-Digesting Tanks Appears in the Lower Left-Hand Corner, with the Hydrolitic Tanks Beyond; the Control House Appears in the Centre, and the Sprinkling Filters at the Right.



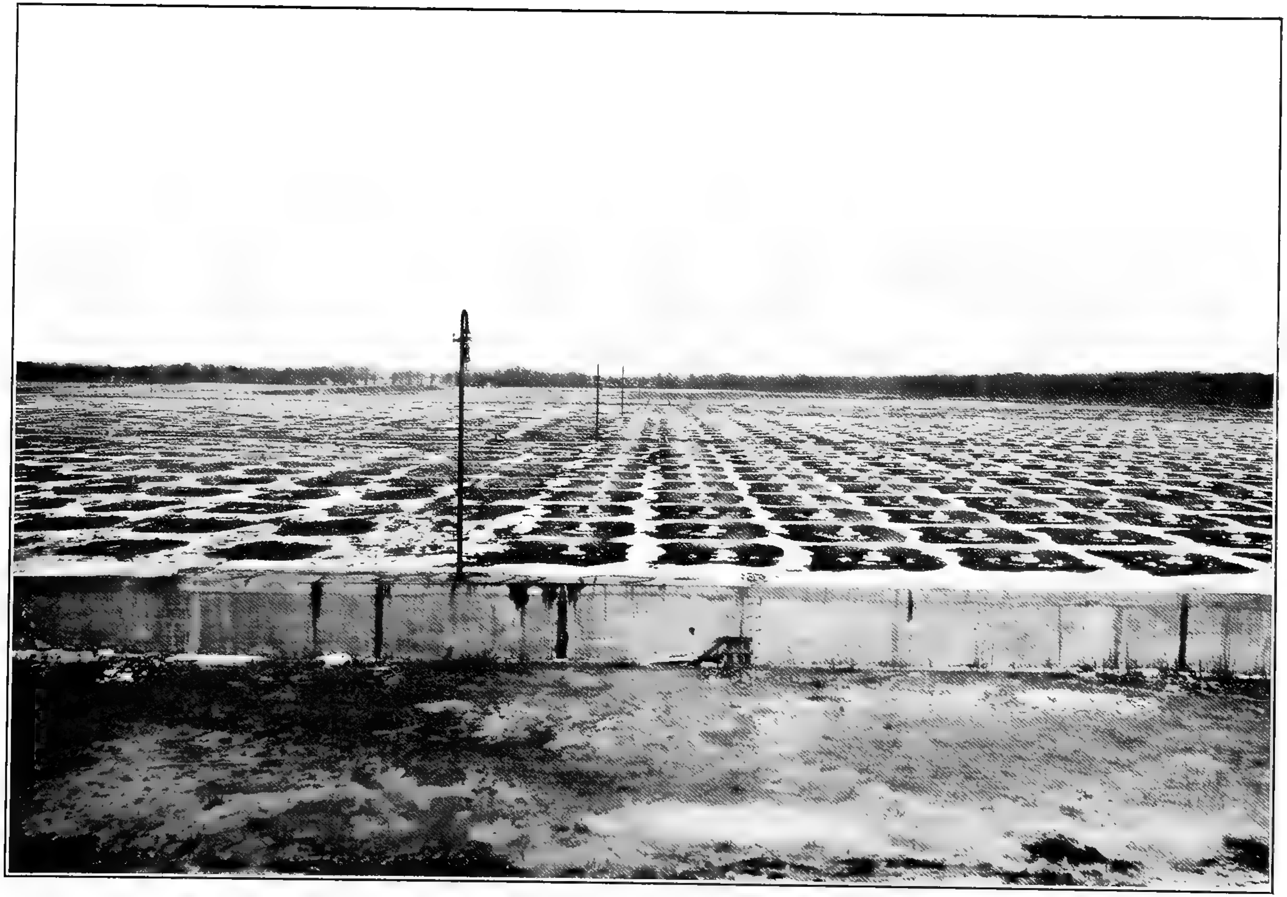
SEWAGE DISPOSAL WORKS.

Cleaning Sludge out of Hydrolitic Tanks.



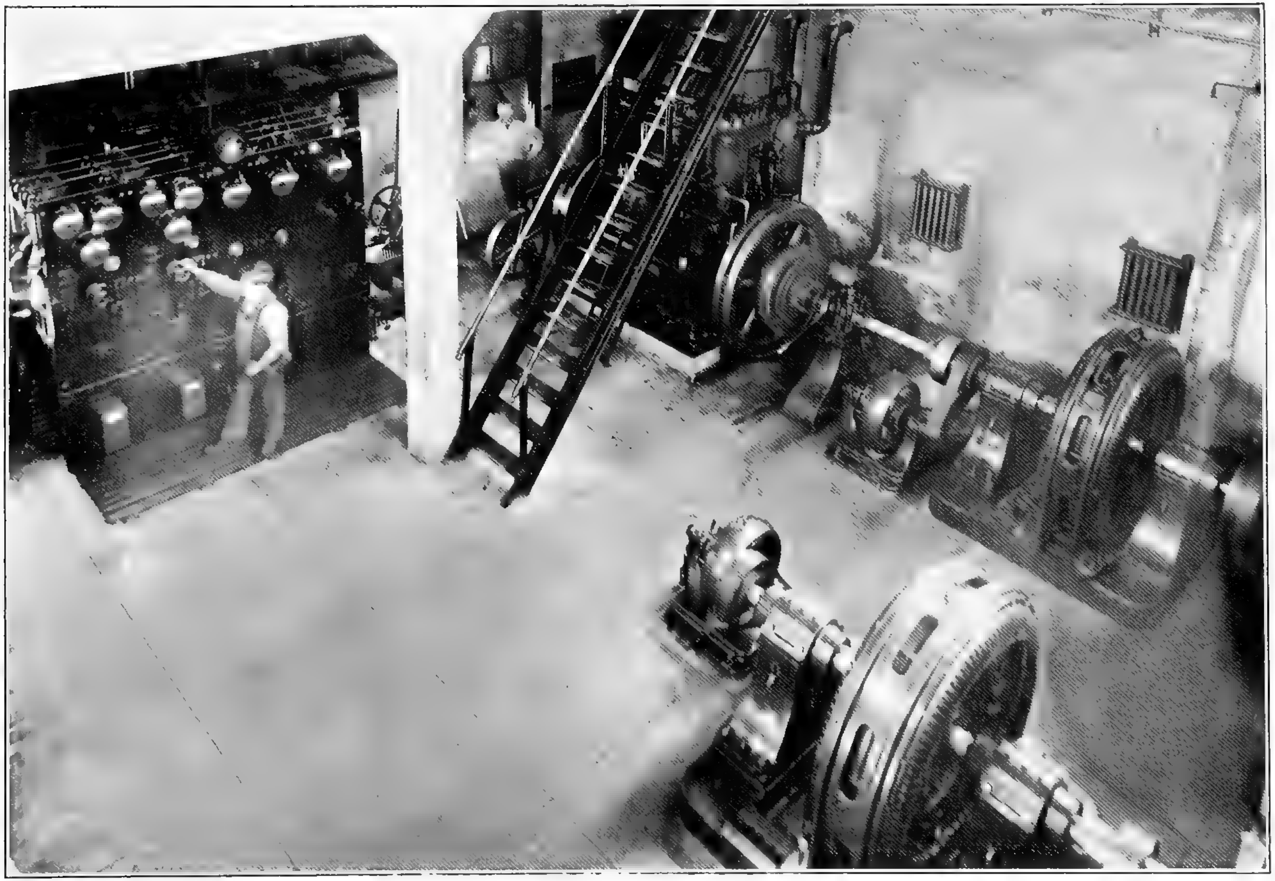
SEWAGE DISPOSAL WORKS.

Revolving Screens Between the Outlet Channel and the Control House. These Screens Are Covered with Wire Cloth Having Sixteen Hundred Meshes per Square Inch.



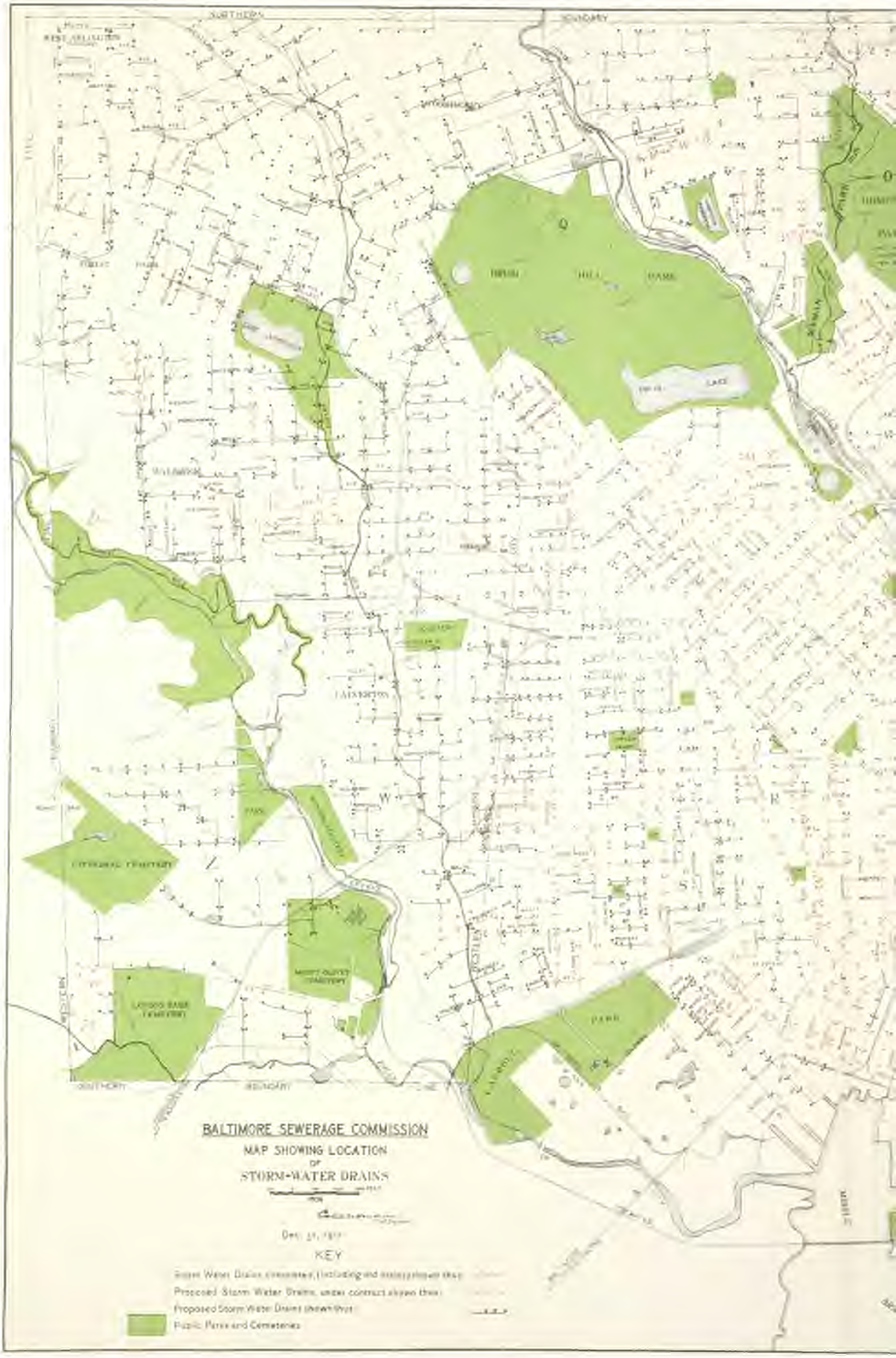
SEWAGE DISPOSAL WORKS.

Sprinkling Filters in Operation in Winter (February 7, 1912). Minimum Temperature, 28 Degrees.



SEWAGE DISPOSAL WORKS.

Interior of Power House, Showing Turbine-Driven Generators, Switch-Board, and Gasoline Engine for Emergency Use.



BALTIMORE SEWERAGE COMMISSION

MAP SHOWING LOCATION
OF
STORM-WATER DRAINS

Dec. 31, 1911

KEY

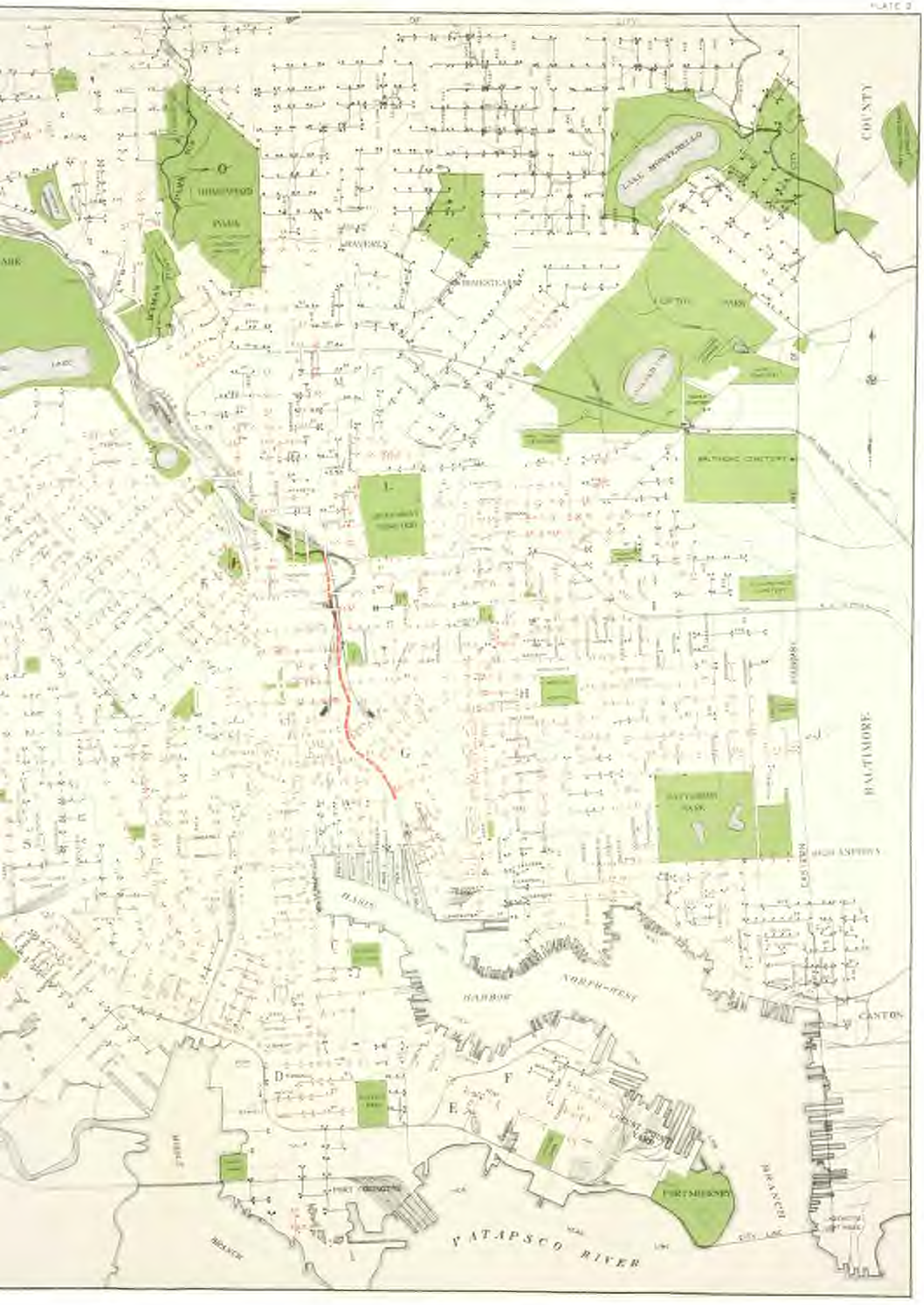
Storm Water Drains completed, (including old drains) shown thus

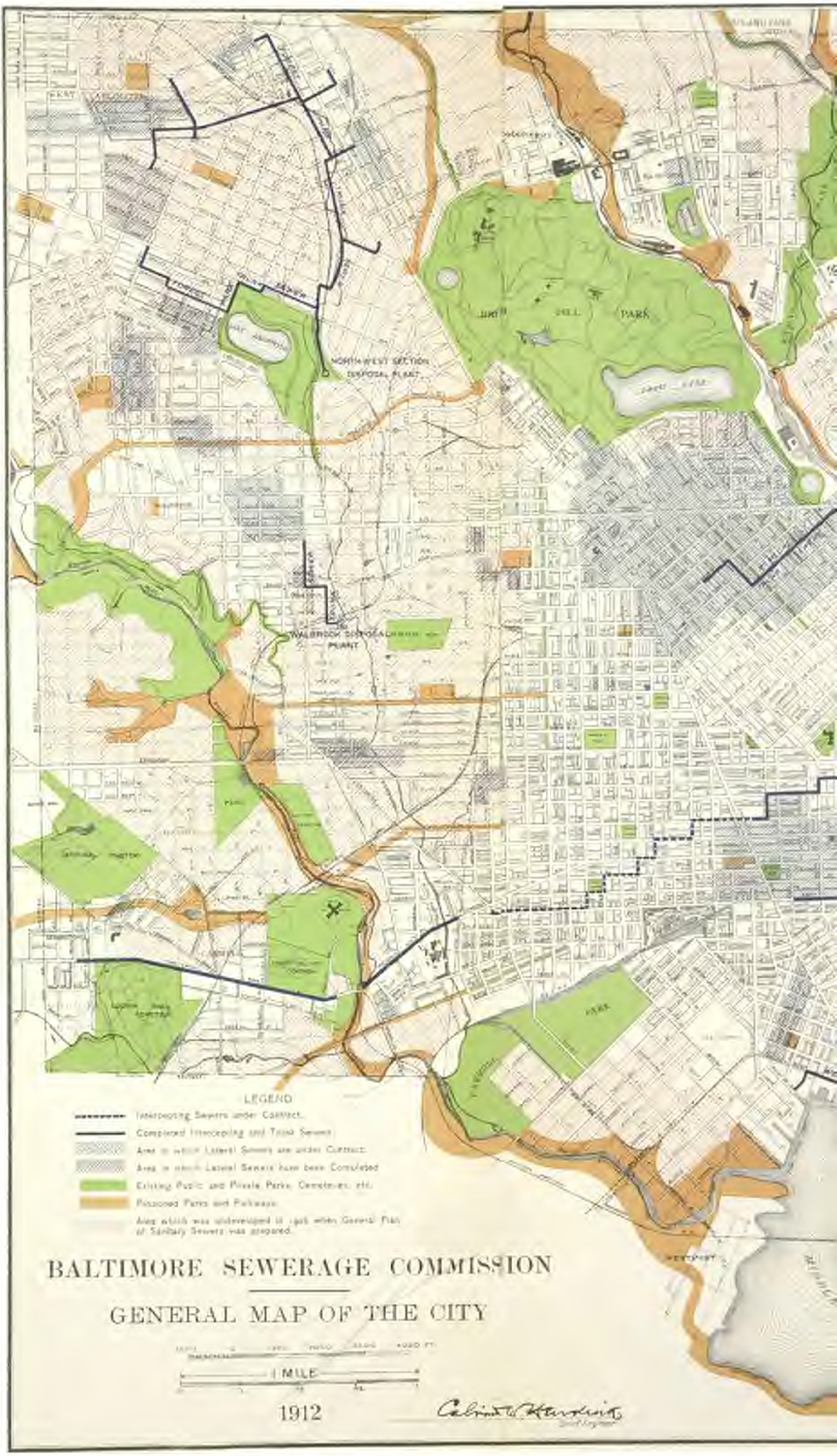
Proposed Storm Water Drains, under contract shown thus

Proposed Storm Water Drains shown thus

🟩 Public Parks and Cemeteries

PLATE 2


OF
CITY
COUNTY
BALTIMORE
LAKE MONTEBELLO
CLIFTON PARK
BALTIMORE CEMETERY
HOMESTEAD
WAVERLY
PARK
LAKE
N
O
M
L
K
I
H
G
R
S
D
E
F
PATTERSON PARK
HIGHLANDTOWN
CANTON
BASIN
NORTH-WEST
HARBOR
LOCUST POINT
FORT McHENRY
PORT COVINGTON
BRANCH
PATAPSCO RIVER
CITY LINE


DRUID HILL PARK
NORTH-WEST SECTION DISPOSAL PLANT
WALBROOK DISPOSAL PLANT
PARK
LEGEND
Intercepting Sewers under Contract
Completed Intercepting and Trunk Sewers
Area in which Lateral Sewers are under Contract
Area in which Lateral Sewers have been Completed
Existing Public and Private Parks, Cemeteries, etc.
Proposed Parks and Parkways
Area which was undeveloped in 1906 when General Plan of Sanitary Sewers was prepared.
1 MILE

BALTIMORE SEWERAGE COMMISSION

GENERAL MAP OF THE CITY

1912

Calvin W. Hendrick
Chief Engineer

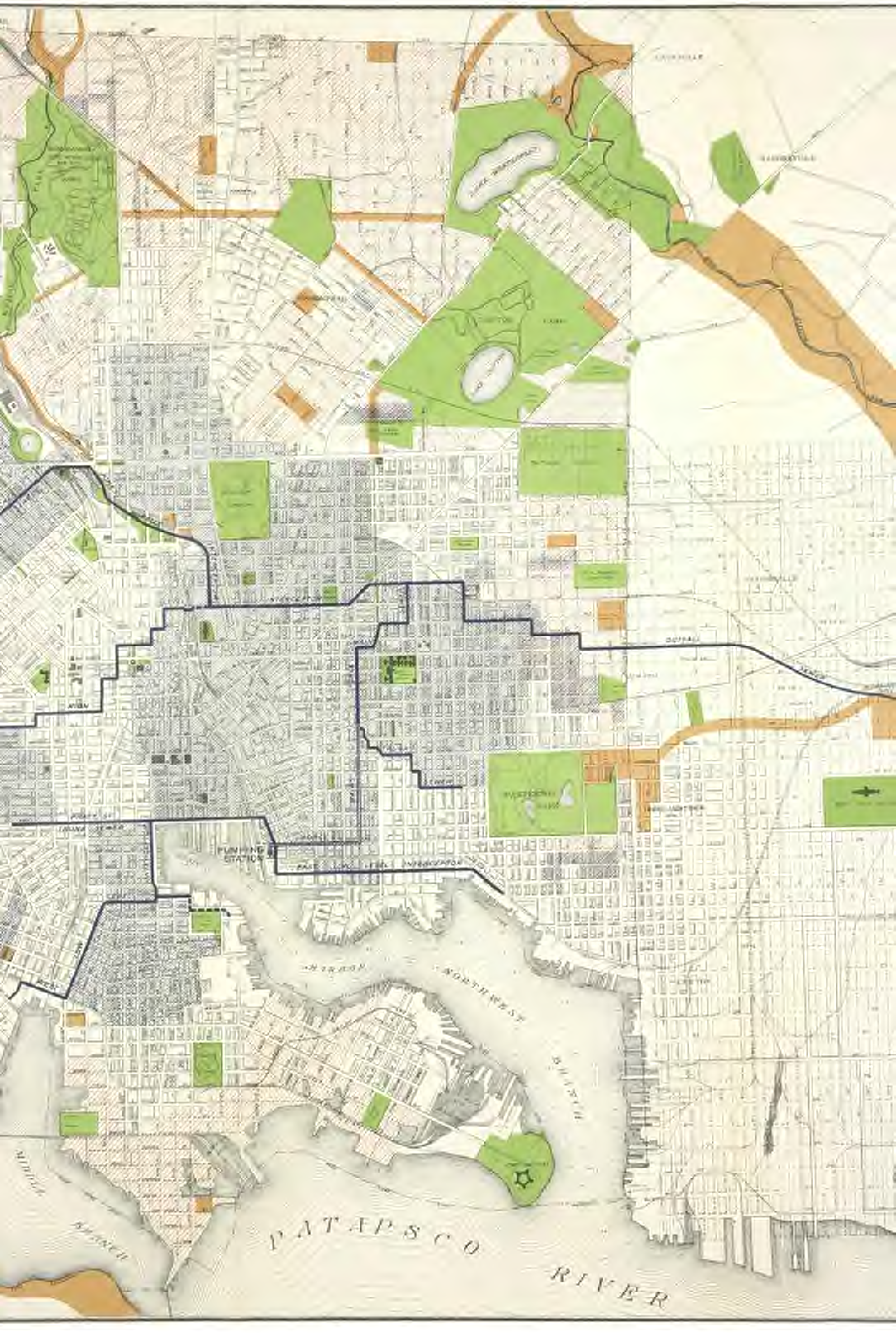
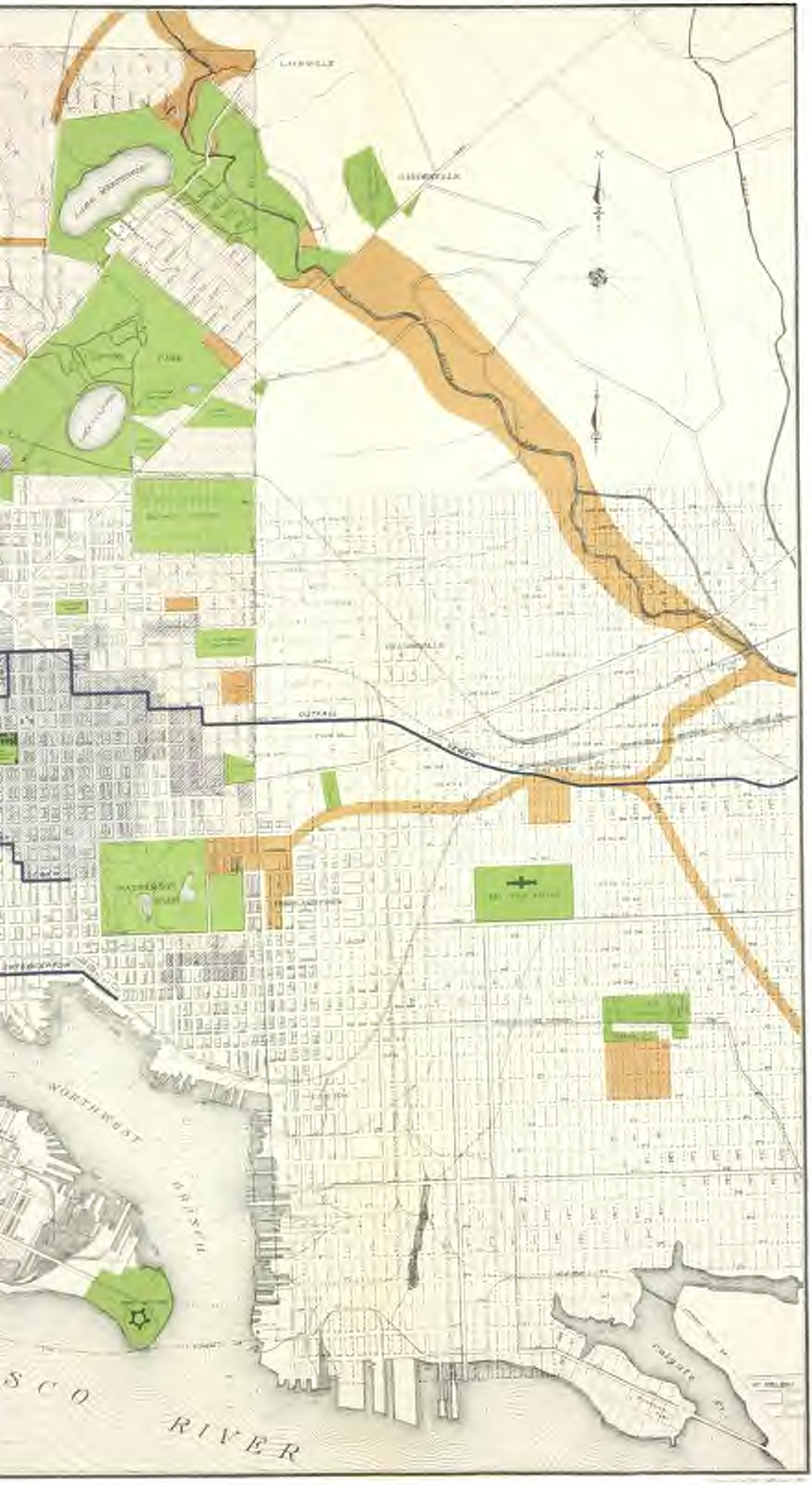

LAKE MONTEBELLO
CLIFTON
PARK
OUTFALL
SEWER
HIGH
LOW
MIDDLE
PUMPING
STATION
INTERCEPTOR
PATTERSON
PARK
HARBOR
NORTHWEST
BRANCH
MIDDLE
BRANCH
PATAPSCO
RIVER

PLATE NO. 5



PARK
N
OUTFALL
PATTERSON PARK
NORTHWEST
BRANCH
S C O
RIVER
Colgate Cr.

TABLE No. 1.

PERSONNEL OF CHIEF ENGINEER'S STAFF.

Name.	Title.	Entered Service.	Remarks.
Albert M. Brosius	First Assistant	Jan. 2, 1906	Resigned February 16, 1912.
Thomas D. Pitts	First Assistant	June 4, 1906	Promoted from Division Engineer Mar. 1, 1912.
Oliver W. Connet	Division Engineer	Jan. 2, 1906	
Alfred H. Hartman	Division Engineer	Jan. 15, 1906	
H. C. McRae	Division Engineer	Jan. 21, 1907	Promoted from Asst. Div. Engr. July 1, 1912.
F. H. Cronin	Mechanical Engineer	May 9, 1911	
John J. Frederick	Secretary	Oct. 1, 1905	
J. Fletcher Apsey	Asst. Div. Engineer	Jan. 15, 1906	
W. A. Megraw	Asst. Div. Engineer	Dec. 3, 1906	
R. L. Burwell	Asst. Div. Engineer	June 24, 1907	
Elliott H. Burwell	Asst. Engineer "AA"	Jan. 15, 1906	Promoted from Asst. Engr. "A" Feb. 1, 1912.
Covington K. Allen	Asst. Engineer "AA"	June 1, 1907	Promoted from Asst. Engr. "A" Feb. 1, 1912.
Henry S. Shryock	Asst. Engineer "AA"	May 1, 1906	Promoted from Asst. Engr. "A" Mar. 1, 1912.
Arthur C. Toner	Asst. Engineer "AA"	Jan. 15, 1906	Promoted from Asst. Engr. "A" Feb. 1, 1912.
John J. Neal	Asst. Engineer "AA"	Nov. 9, 1906	Promoted from Inspector "A" Nov. 1, 1912.
Milton J. Ruark	Asst. Engineer "AA"	Jan. 22, 1912	Promoted from Inspector "A" Feb. 1, 1912.
F. W. McKinney	Asst. Engineer "AA"	Jan. 1, 1912	Promoted from Asst. Engr. "A" April 24, 1912.
Levin J. Houston, Jr.	Asst. Engineer "A"	Jan. 15, 1906	Resigned Jan. 15, 1912.
Thomas M. Ward	Asst. Engineer "A"	Nov. 16, 1911	Resigned Jan. 1, 1912.
Frank J. Parran	Asst. Engineer "A"	May 28, 1907	
Henry S. Regester	Asst. Engineer "A"	Jan. 15, 1906	Promoted from Asst. Engr. "B" Mar. 16, 1912.
Harry F. Schaefer	Asst. Engineer "A"	June 20, 1907	Promoted from Asst. Engr. "B" Mar. 1, 1912.
John Moore, Jr.	Asst. Engineer "A"	May 16, 1907	Promoted from Asst. Engr. "B" June 1, 1912.
William L. Williams	Asst. Engineer "A"	June 27, 1907	Promoted from Asst. Engr. "B" Feb. 1, 1912, resigned Mar. 2, 1912.

TABLE No. 1—*Continued.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
Robert Rumbold	Asst. Engineer "A"	Feb. 1, 1906	Promoted from Asst. Engr. "B" June 1, 1912.
Gustav J. Requardt	Asst. Engineer "A"	June 23, 1909	Promoted from Asst. Engr. "B" June 1, 1912.
F. D. Christhilf	Asst. Engineer "A"	July 7, 1909	Promoted from Inspector "B" June 1, 1912.
Frank H. Firoved	Asst. Engineer "A"	Jan. 23, 1906	Promoted from Draftsman "A" Feb. 1, 1912.
J. Elmer Shepperd	Asst. Engineer "A"	July 2, 1906	Promoted from Draftsman "A" June 15, 1912.
C. Boone Sadler	Asst. Engineer "A"	Aug. 1, 1907	Promoted from Draftsman "A" July 1, 1912.
Edmund P. Burke	Asst. Engineer "A"	Mar. 27, 1912	Promoted from Inspector "C" June 1, 1912.
S. M. Klein	Asst. Engineer "A"	Jan. 8, 1912	Promoted from Asst. Engr. "B" Nov. 1, 1912.
Ralph Hutchins	Asst. Engineer "B"	Feb. 1, 1906	
J. H. Ensey	Asst. Engineer "B"	Nov. 29, 1911	
F. W. Caspari	Asst. Engineer "B"	Feb. 1, 1906	Resigned Nov. 9, 1912.
Joseph H. Straus, Jr.	Asst. Engineer "B"	June 9, 1908	Resigned Mar. 15, 1912.
J. Wightman Cleaveland	Asst. Engineer "B"	Dec. 24, 1906	
J. Milton Knight	Asst. Engineer "B"	Aug. 4, 1908	Promoted from Inspector "C" June 1, 1912.
J. Lee Chapman	Asst. Engineer "B"	Nov. 15, 1911	Promoted from Draftsman "C" April 1, 1912.
E. H. Brosius	Asst. Engineer "B"	May 9, 1911	Promoted from Draftsman "C" May 7, 1912; resigned July 1, 1912.
Leslie C. Frank	Asst. Engineer "B"	July 25, 1911	Promoted from Draftsman "C" to Rodman "A" Jan. 1, 1912; to Asst. Engr. "B" June 1, 1912; resigned Oct. 15, 1912.
G. Herman Carl	Asst. Engineer "B"	Aug. 1, 1911	Promoted from Draftsman "C" Feb. 1, 1912.
R. Taylor Tunstall	Asst. Engineer "B"	Jan. 15, 1906	Promoted from Rodman "A" to Inspector "C" May 16, 1912; to Asst. Engr. "B" June 1, 1912.
Isadore Behrman	Asst. Engineer "B"	July 22, 1910	Promoted from Rodman "A" Feb. 1, 1912; resigned April 23, 1912.

TABLE No. 1—*Continued.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
Harry M. Webb........	Asst. Engineer "B"....	June 1, 1909..	Promoted from Rodman "A" June 1, 1912.
J. S. Thompson, Jr.....	Asst. Engineer "B"....	Oct. 3, 1911..	Promoted from Rodman "A" Dec. 15, 1912.
Paul Wroth............	Asst. Engineer "B"....	May 19, 1908..	Promoted from Rodman "B" to Rodman "A" Feb. 1, 1912; to Asst. Engr. "B" May 16, 1912.
H. W. Johenning.......	Asst. Engineer "B"....	June 24, 1908..	Promoted from Rodman "B" to Rodman "A" Feb. 1, 1912; to Asst. Engr. "B" June 1, 1912.
J. M. Bandel...........	Asst. Engineer "B"....	Mar. 18, 1912..	Promoted from Inspector "C" June 16, 1912.
A. R. James............	Asst. Engineer "B"....	Apr. 10, 1912..	Resigned April 16, 1912.
Irving P. Kane.........	Asst. Engineer "B"....	May 22, 1912..	
William D. Wrightson..	Asst. Engineer "B"....	May 16, 1912..	Dropped July 20, 1912.
Edward F. Davis......	Inspector "A"..........	Dec. 24, 1906..	
Charles S. York.......	Inspector "A	Nov. 7, 1906..	
John H. Sothoron......	Inspector "A"..........	July 5, 1907..	
Charles I. Hammond....	Inspector "A"..........	Nov. 7, 1906..	Promoted from Inspector "B" Feb. 1, 1912.
Aulbin D. Tapscott.....	Inspector "A"..........	Nov. 19, 1906..	Promoted from Inspector "B" Feb. 1, 1912.
George T. Robinson....	Inspector "A"..........	June 1, 1907..	Promoted from Inspector "B Feb. 1, 1912.
Walter J. Caple........	Inspector "A"..........	July 5, 1907..	Promoted from Inspector "B" July 16, 1912.
Stephen A. Lusby......	Inspector "B"..........	Apr. 6, 1907..	
A. E. B. Jones.........	Inspector "B"..........	Jan. 15, 1906..	Resigned June 15, 1912.
Henry A. Albert.......	Inspector "B"..........	June 1, 1907..	Promoted from Inspector "C" May 1, 1912.
John F. Garrett........	Inspector "B"..........	Nov. 16, 1906..	Promoted from Inspector "C" Feb. 1, 1912.
Karl E. G. Kaufman...	Inspector "B"..........	Jan. 15, 1906..	Promoted from Inspector "C" June 1, 1912.
F. DeWolf Theobald..	Inspector "B"..........	Aug. 9, 1907..	Promoted from Inspector "C" Feb. 1, 1912.
John C. Strohm........	Inspector "B"..........	Jan. 15, 1906..	Promoted from Inspector "C" May 1, 1912.

TABLE No. 1—*Continued.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
George E. Schaeffer	Inspector "B"	Aug. 11, 1908	Promoted from Inspector "C" Feb. 1, 1912.
E. B. Richards	Inspector "B"	Jan. 15, 1906	Promoted from Inspector "C" Oct. 15, 1912.
J. H. Gambrell	Inspector "B"	Jan. 15, 1906	Promoted from Inspector "C" Oct. 15, 1912.
William H. Bell	Inspector "B"	Dec. 19, 1906	Resigned Nov. 15, 1910; reappointed Oct. 23, 1911.
William A. Brogden	Inspector "C"	Nov. 7, 1906	Resigned Nov. 15, 1910; reappointed Oct. 10, 1911.
Henry Kelly	Inspector "C"	July 17, 1907	
J. Hamilton Davidson	Inspector "C"	Oct. 9, 1907	Resigned Jan. 23, 1912.
A. S. Bartholomaei	Inspector "C"	Oct. 9, 1907	
William J. Boyle	Inspector "C"	Apr. 16, 1907	Promoted from Rodman "A" July 1, 1912.
William Byrd	Inspector "C"	June 1, 1907	
George B. Roberts	Inspector "C"	June 23, 1909	Resigned April 15, 1911; reappointed April 1, 1912.
Martin W. Garrett	Inspector "C"	July 19, 1908	
Lawrence H. Francis	Inspector "C"	Jan. 15, 1906	
John Lynch	Inspector "C"	June 1, 1909	
John A. Holthaus	Inspector "C"	Nov. 29, 1911	Dropped Oct. 23, 1912.
H. Howard Williams	Inspector "C"	Sept. 21, 1906	Resigned Feb. 15, 1912.
William F. Dolliver	Inspector "C"	July 7, 1909	
Harry G. Maynard	Inspector "C"	June 23, 1909	
John Daugherty	Inspector "C"	May 17, 1909	
Herbert N. Chipchase	Inspector "C"	Nov. 1, 1911	Promoted from Draftsman "C" July 1, 1912.
D. W. Glass	Inspector "C"	Dec. 26, 1911	Promoted from Draftsman "C" April 1, 1912.
William Wagner	Inspector "C"	Jan. 15, 1906	Promoted from Rodman "A" Feb. 1, 1912.

TABLE No. 1—*Continued.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
Thomas W. Sasscer	Inspector "C"	May 20, 1908	Promoted from Rodman "A" Oct. 15, 1912.
Harry N. Brannan	Inspector "C"	Oct. 3, 1911	Promoted from Rodman "A" Feb. 1, 1912; resigned May 1, 1912.
John T. Merritt	Inspector "C"	Nov. 29, 1911	Promoted from Rodman "B" Mar. 16, 1912.
W. K. Potter	Inspector "C"	Oct. 3, 1911	Promoted from Rodman "B" to Rodman "A" May 16, 1912; from Rodman "A" June 1, 1912.
W. H. Vickers	Inspector "C"	Oct. 17, 1911	Promoted from Rodman "B" June 16, 1912.
Stuart Anderson	Inspector "C"	Feb. 5, 1912	Promoted from Draftsman "C" May 16, 1912.
Brook G. Bird	Inspector "C"	Mar. 7, 1912	
Norman E. Brice	Inspector "C"	Mar. 25, 1912	
H. C. Brooks	Inspector "C"	Oct. 16, 1912	
A. J. Carey	Inspector "C"	Mar. 14, 1912	
Newell D. Chase	Inspector "C"	Apr. 3, 1912	
Louis Cremona	Inspector "C"	May 1, 1912	
H. R. Devilbiss	Inspector "C"	May 8, 1912	
L. N. Fisher	Inspector "C"	June 17, 1912	Promoted from Rodman "B" Oct. 15, 1912.
Alfred P. Gwynn	Inspector "C"	Oct. 24, 1912	
Thomas S. Hauch	Inspector "C"	May 7, 1912	
C. I. Haven	Inspector "C"	June 17, 1912	Promoted from Rodman "B" Oct. 15, 1912.
William E. Hearing	Inspector "C"	Mar. 14, 1912	
George Kenly	Inspector "C"	Oct. 3, 1912	
L. F. Magness	Inspector "C"	June 17, 1912	Resigned Sept. 1, 1912.
E. W. Magruder	Inspector "C"	June 13, 1912	
J. B. Maguire	Inspector "C"	Oct. 11, 1912	
Vincent T. Malcolm	Inspector "C"	Apr. 24, 1912	

TABLE No. 1—*Continued.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
J. C. Marlatt	Inspector "C"	May 16, 1912	
R. E. L. Martin	Inspector "C"	Apr. 18, 1912	
L. E. Massey	Inspector "C"	Nov. 6, 1912	
H. F. Meyers, Jr.	Inspector "C"	May 1, 1912	Resigned June 5, 1912.
G. G. B. Nelson	Inspector "C"	Mar. 18, 1912	
J. Robert Owens	Inspector "C"	Apr. 15, 1912	
J. A. Reynolds	Inspector "C"	Oct. 17, 1912	
Joseph W. Rogers	Inspector "C"	Apr. 24, 1912	
H. T. Sasscer	Inspector "C"	June 6, 1912	
L. D. Sasscer	Inspector "C"	May 15, 1912	
Charles P. Schlarb	Inspector "C"	June 1, 1912	
John E. Sheridan	Inspector "C"	Feb. 16, 1912	Promoted from Draftsman "C" May 16, 1912.
M. J. Slingluff	Inspector "C"	Oct. 14, 1912	
Ballard R. Smith	Inspector "C"	June 1, 1912	
C. F. Tausky	Inspector "C"	Mar. 20, 1912	
Harvey Wagner	Inspector "C"	June 17, 1912	Resigned Nov. 1, 1912.
G. E. Warren	Inspector "C"	June 17, 1912	Promoted from Rodman "B" Oct. 15, 1912.
Claude R. Whitaker	Inspector "C"	Apr. 1, 1912	
W. S. Wicker	Inspector "C"	June 4, 1912	
L. B. Williams	Inspector "C"	Oct. 25, 1912	
Edwin J. Wolfe	Inspector "C"	June 1, 1912	
L. Chase Wright	Inspector "C"	June 17, 1912	Promoted from Rodman "A" Nov. 19, 1912.
Claude A. Murphy	Draftsman "A"	Jan. 15, 1906	
E. V. Hax	Draftsman "A"	Jan. 15, 1906	Resigned Aug. 1, 1912.
Maurice F. Rodgers	Draftsman "A"	Dec. 1, 1905	

TABLE No. 1—*Continued.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
George W. Townsend	Draftsman "A"	Nov. 18, 1907	Promoted from Draftsman "B" Feb. 1, 1912.
Clarence G. Harig	Draftsman "A"	Apr. 20, 1908	Promoted from Draftsman "B" Feb. 1, 1912.
Robert Dall, Jr.	Draftsman "A"	July 18, 1910	Promoted from Draftsman "B" July 1, 1912.
Horace A. Browne	Draftsman "A"	July 5, 1907	Promoted from Inspector "C" Sept. 16, 1912.
Thomas D. Conn	Draftsman "C"	Nov. 21, 1910	
E. Edgar Wood	Draftsman "C"	Oct. 3, 1911	
Samuel Appleby	Draftsman "C"	Aug. 1, 1911	
E. B. Gilmour	Draftsman "C"	June 12, 1911	
C. F. Black	Draftsman "C"	June 12, 1911	
Alfred Betz	Draftsman "C"	May 1, 1912	
J. Arthur Clark	Draftsman "C"	June 10, 1912	
Albert Clunan	Draftsman "C"	July 2, 1912	Resigned July 15, 1912.
W. Graham Cole	Draftsman "C"	June 3, 1912	
W. Howard Corddry	Draftsman "C"	May 1, 1912	
P. F. Davenport	Draftsman "C"	Apr. 16, 1912	
Carroll Edgar	Draftsman "C"	Oct. 4, 1912	
C. F. Flayhart	Draftsman "C"	June 13, 1912	
E. M. Hamilton	Draftsman "C"	July 3, 1912	
H. J. Horn	Draftsman "C"	Oct. 4, 1912	Resigned Oct. 21, 1912.
William L. Iardella	Draftsman "C"	Mar. 3, 1911	
Walter E. Lee	Draftsman "C"	Dec. 9, 1912	
M. W. Loving	Draftsman "C"	June 25, 1912	
D. H. Lucchessi, Jr.	Draftsman "C"	May 7, 1912	
Samuel A. Mazer	Draftsman "C"	June 3, 1912	
Louis Z. Mearns	Draftsman "C"	Feb. 16, 1912	Died April 3, 1912.

TABLE No. 1—*Continued.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
J. L. Miller	Draftsman "C"	Apr. 24, 1912	
W. K. Miller	Draftsman "C"	July 29, 1912	
George McLean	Draftsman "C"	May 1, 1912	Resigned Oct. 1, 1912.
Walter J. O'Neill	Draftsman "C"	Oct. 10, 1912	
C. L. Ofenstein	Draftsman "C"	Nov. 1, 1912	
Edwin A. Plitt	Draftsman "C"	Nov. 14, 1912	
Harry P. Poole	Draftsman "C"	May 16, 1912	
Leslie B. Pope	Draftsman "C"	Apr. 3, 1912	
Richard J. Reese	Draftsman "C"	Sept. 25, 1912	
William C. Runge	Draftsman "C"	Oct. 21, 1912	
Herman A. Schneider	Draftsman "C"	Apr. 12, 1912	
A. L. Shalowitz	Draftsman "C"	Oct. 1, 1912	
John K. Siems	Draftsman "C"	Nov. 11, 1912	
William H. Siems	Draftsman "C"	May 7, 1912	
Julius O. Siegfield	Draftsman "C"	Apr. 18, 1912	
J. F. Diggs	Rodman "A"	Oct. 3, 1911	Transferred from Draftsman "C" Nov. 1, 1912.
William A. Twamley	Rodman "A"	Dec. 4, 1911	Promoted from Draftsman "C" June 16, 1912.
Dudley G. Frazer	Rodman "A"	Aug. 1, 1911	Transferred from Draftsman "C" April 1, 1912.
William J. Frere, Jr.	Rodman "A"	June 6, 1911	Transferred from Draftsman "C" to Rodman "B" March 5, promoted from Rodman "B" April 1, 1912.
L. Carroll Miller	Rodman "A"	Jan. 25, 1906	
Wilford H. Herbert	Rodman "A"	July 16, 1906	
C. J. Hellen	Rodman "A"	June 12, 1911	Promoted from Rodman "B" Mar. 16, 1912.
William C. Briscoe	Rodman "A"	Nov. 16, 1909	Promoted from Rodman "B" July 1, 1912.

TABLE No. 1—*Continued.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

Name.	Title.	Entered Service.	Remarks.
Owen Laws	Rodman "A"	June 3, 1912	Promoted from Rodman "B" Oct. 15, 1912.
C. F. Martin	Rodman "A"	May 13, 1912	
Edwin H. Nordman	Rodman "A"	Apr. 17, 1912	
John T. Rooney	Rodman "A"	July 1, 1912	Promoted from Rodman "B" Sept. 16, 1912.
Charles W. Rose	Rodman "A"	Oct. 14, 1912	
T. R. Schoonmaker	Rodman "A"	June 26, 1912	Promoted from Rodman "B" Dec. 15, 1912.
Bradley H. Waltz	Rodman "A"	Apr. 19, 1912	Resigned Sept. 1, 1912.
A. H. Wernsdorfer	Rodman "A"	Mar. 18, 1912	Promoted from Rodman "B" May 16, 1912.
Wm. B. O'Connor, Jr.	Rodman "B"	Oct. 17, 1911	Promoted from Draftsman "C" Mar. 1, 1912.
Charles H. Brooks	Rodman "B"	Nov. 16, 1907	
Conrad F. Kraeter	Rodman "B"	Sept. 20, 1906	
C. G. Walker	Rodman "B"	Dec. 1, 1911	
A. T. Hilton	Rodman "B"	Oct. 3, 1911	
J. P. Joynes	Rodman "B"	June 12, 1911	
Alan F. Bristor	Rodman "B"	Oct. 10, 1912	
Chauncey Brooks	Rodman "B"	Apr. 24, 1912	
C. D. Cann	Rodman "B"	June 14, 1912	
James A. Cullen	Rodman "B"	May 1, 1912	Resigned Oct. 21, 1912.
M. E. Gerlach	Rodman "B"	May 28, 1912	
Ray F. Gildea	Rodman "B"	Aug. 1, 1912	
E. Bernard Green	Rodman "B"	Apr. 10, 1912	
H. Reid Treiber	Rodman "B"	Feb. 5, 1912	
S. T. W. Green	Rodman "B"	Jan. 2, 1912	Promoted from Draftsman "C" July 1, 1912.
C. W. Hook	Rodman "B"	Apr. 4, 1912	
E. H. Howard	Rodman "B"	Mar. 6, 1912	

TABLE No. 1—*Continued.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
F. L. Maier	Rodman "B"	June 24, 1912	
M. H. Melvin	Rodman "B"	June 27, 1912	
Jos. P. McCafferty	Rodman "B"	June 24, 1912	
James H. McCay	Rodman "B"	Mar. 14, 1912	
Robert Piggott	Rodman "B"	Mar. 18, 1912	
William T. Snyder	Rodman "B"	Mar. 28, 1912	
Thomas G. Stowe	Rodman "B"	Feb. 19, 1912	Promoted from Clerk Sept. 16, 1912.
Guy C. Sykes	Rodman "B"	May 22, 1912	
E. S. Trine	Rodman "B"	Nov. 14, 1912	
Otis G. Wilbur	Rodman "B"	Nov. 18, 1912	
Oscar R. Willey	Rodman "B"	May 27, 1912	
Henri H. Smith	Rodman "B"	Aug. 18, 1910	Promoted from Clerk Mar. 1; resigned May 1, 1912.
George J. Armeling	Chemist	Aug. 8, 1907	Promoted from Asst. Chemist Feb. 1, 1912.
H. R. Gundlach	Bacteriologist	Nov. 1, 1911	Resigned June 1, 1912.
Urban Preller	Laboratory Assistant	June 1, 1912	
H. N. O'Brien	Supt. Day Labor	Oct. 11, 1907	Promoted from Draftsman "C" to Inspector "C" Mar. 1; promoted from Inspector "C" Nov. 1, 1912.
Adam W. Gerlach	Stenographer "A"	June 16, 1909	
Cloyd S. Weaver	Stenographer "A"	Jan. 2, 1912	Promoted from Stenographer "B" June 15, 1912.
W. L. Prout	Stenographer "A"	Apr. 5, 1911	Promoted from Stenographer "B" May 16, 1912.
J. L. Pennington	Stenographer "B"	July 23, 1909	

TABLE No. 1—*Concluded.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

Name.	Title.	Entered Service.	Remarks.
F. W. Ensey	Stenographer "B"	Apr. 11, 1911	Resigned Jan. 6, 1912.
George F. Bayliss	Stenographer "B"	Feb. 5, 1912	
Leo Hogan	Stenographer "B"	June 1, 1912	Resigned Oct. 1, 1912.
Edison M. Hughes	Stenographer "B"	Feb. 1, 1912	
S. Robert Martin	Stenographer "B"	Feb. 19, 1912	
George W. Schiminger	Stenographer "B"	Oct. 11, 1912	
Robert F. Windfohr	Stenographer "B"	Oct. 28, 1912	
M. H. Frank	File Clerk	Jan. 25, 1912	
William C. Higgins	Clerk	Oct. 3, 1912	

TABLE No. 2.

STATEMENT OF CONTRACTS LET PRIOR TO 1912.

Contract.	Date of Contract.	Name of Contractor.	Proportion of Work Completed December 31, 1912.
Wash Borings No. 1	July 2, 1906.	B. F. Smith & Bro.	Completed July 28, 1906.
Testing Plant	Oct. 17, 1906.	Malcolm W. Hill Co.	Completed July 1, 1907.
Laboratory	Oct. 18, 1906.	Wm. Kirkpatrick	Completed Feb. 1, 1907.
Storm Water No. 1	Oct. 18, 1906.	M. A. Talbott Co.	Completed April 14, 1908.
Sanitary Sewers—Walbrook	Oct. 29, 1906.	M. A. Talbott Co.	Completed June 27, 1907.
Outfall Sewer, Section No. 1	Dec. 7, 1906.	M. A. Talbott Co.	Completed August 1, 1909.
Outfall Sewer, Section No. 2	Dec. 7, 1906.	M. A. Talbott Co.	Completed August 6, 1908.
Sewage Pumping Plant Mach'y.	Dec. 12, 1906.	Bethlehem Steel Co.	99 per cent.
West Low Level Interceptor, Section No. 1	May 1, 1907.	Metropolitan Contr. Co.	Completed March 26, 1908.
West Low Level Interceptor, Section No. 2	May 1, 1907.	Metropolitan Contr. Co.	Completed March 26, 1908.
Outfall Sewer, Section No. 3	May 4, 1907.	J. Connelly Const. Co.	Completed June 7, 1909.
Outfall Sewer, Section No. 7	May 4, 1907.	J. Connelly Const. Co.	Completed Dec. 19, 1908.
Outfall Sewer, Section No. 8	May 4, 1907.	J. Connelly Const. Co.	Completed Nov. 1, 1908.
Outfall Sewer, Section No. 9	May 4, 1907.	A. F. Helm	Completed Oct. 13, 1908.
Outfall Sewer, Section No. 6	May 28, 1907.	David Peoples	Completed Oct. 16, 1908.
Storm-Water No. 2	May 28, 1907.	David Peoples	Completed May 11, 1909.
Storm-Water No. 3	May 28, 1907.	David Peoples	Completed May 15, 1909.
High Level Interceptor, Section No. 1	May 29, 1907.	M. A. Talbott Co.	Completed Nov. 5, 1908.
High Level Interceptor, Section No. 2	May 29, 1907.	M. A. Talbott Co.	Completed May 1, 1909.

TABLE No. 2—*Continued.*

STATEMENT OF CONTRACTS LET PRIOR TO 1912.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PROPORTION OF WORK COMPLETED DECEMBER 31, 1912.
Outfall Sewer, Section No. 4	May 29, 1907.	M. A. Talbott Co.	Completed March 17, 1909.
Outfall Sewer, Section No. 5	May 29, 1907.	M. A. Talbott Co.	Completed August 1, 1909.
Outfall Sewer, Section No. 10.	June 10, 1907.	J. Connelly Const. Co.	Completed Nov. 1, 1908.
	NOTE.—This contract was first awarded to J. Erwin Hillpot, but he was unable to furnish satisfactory bond and the contract was reawarded to the J. Connelly Construction Company, the next lowest bidder.		
Sewage Disposal Plant, Clearing and Grubbing Disposal Area	July 8, 1907.	Lane Bros. Co. & Jones.	Completed Sept. 1, 1909.
	NOTE.—This contract was awarded on April 24 to J. Erwin Hillpot, but he was unable to furnish a satisfactory bond and the work was readvertised.		
Digging Test Well on site of Sewage Pumping Station	July 29, 1907.	Metropolitan Contr. Co.	Completed August 27, 1907.

TABLE No. 2—*Continued.*

STATEMENT OF CONTRACTS LET PRIOR TO 1912.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PROPORTION OF WORK COMPLETED DECEMBER 31, 1912.
West Low Level Interceptor, Section No. 3	Feb. 28, 1908.	Metropolitan Contr. Co.	Completed Oct. 30, 1908.
East Low Level Interceptor, Section No. 1	May 8, 1908.	T. J. O'Connell	Completed May 15, 1909.
East Low Level Interceptor, Section No. 2	May 8, 1908.	T. J. O'Connell	Completed May 15, 1909.
Grading Manderson lot	May 8, 1908.	Gustavus Heckel	Completed June 29, 1908.
Sewage Pumping Station, Superstructure	May 9, 1908.	Noel Construction Co.	99 per cent.
Sewage Pumping Station, Substructure	May 9, 1908.	Noel Construction Co.	Completed August 1, 1911.
Storm Water Contract No. 4	June 17, 1908.	Reilly & Riddle	Completed March 16, 1909.
Roadway, Willis avenue	Aug. 7, 1908.	L. B. McCabe	Completed Nov. 30, 1908.
Storm Water Contract No. 5	Sept. 17, 1908.	David Peoples	Completed Jan. 23, 1909.
Roadways on Baltimore Brick Company's property	Sept. 28, 1908.	Thos. Mullan	Completed Dec. 7, 1908.
West Low Level Interceptor, Section No. 4	Oct. 28, 1908.	Metropolitan Contr. Co.	Completed July 10, 1909.
Force Main	Nov. 2, 1908.	Warren F. Brenizer Co.	Completed Oct. 12, 1909.
Force Main Sewer	Nov. 4, 1908.	Ryan & Reilly	Completed Sept. 30, 1909.
Sewage Disposal Plant	Nov. 4, 1908.	New York Continental Jewell Filtration Co.	Completed Dec. 23, 1910.
Storm Water Contract No. 6	Dec. 31, 1908.	Booth & Flinn	Completed Jan. 28, 1910.

TABLE No. 2—*Continued.*

STATEMENT OF CONTRACTS LET PRIOR TO 1912.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PROPORTION OF WORK COMPLETED DECEMBER 31, 1912.
Filter Stone for Sewage Disposal Plant................	Dec. 31, 1908.	Fisher & Carozza.......	Completed June 1, 1911.
Sanitary Contract No. 35, Lateral Sewers, District No. 26.	Mar. 6, 1909.	T. Wallace Reilly.......	Completed Oct. 7, 1909.
Sanitary Contract No. 37, Sewage Disposal Plant, water Tanks and Tower..........	Feb. 19, 1909.	Horace E. Horton (Chicago Bridge and Iron Works).............	Completed Sept. 1, 1909.
Sanitary Contract No. 38, Lateral Sewers, District No. 28.	April 19, 1909.	Ryan & Reilly..........	Completed Nov. 10, 1909.
Sanitary Contract No. 39, Lateral Sewers, District No. 30.	April 15, 1909.	James Ferry & Sons....	Completed Sept. 25, 1909.
Sanitary Contract No. 40, Forest Park Sewage Disposal Works...............	Sept. 15, 1909.	Lane Bros. Co. & Jones.	Completed Oct. 25, 1910.
Sanitary Contract No. 41, Trunk Sewers, District No. 48	Sept. 10, 1909.	T. Wallace Reilly......	Contract abandoned June 15, 1910. 72% of work completed.
Sanitary Contract No. 42, Jones Falls Interceptor, Section No. 1	Sept. 22, 1909.	M. A. Talbott Co......	Completed Oct. 15, 1910.
Sanitary Contract No. 43, Lateral Sewers, District No. 29.	Sept. 11, 1909.	Wm. McCarthy & Co...	Completed April 25, 1910.

TABLE No. 2—*Continued*.

STATEMENT OF CONTRACTS LET PRIOR TO 1912.

Contract.	Date of Contract.	Name of Contractor.	Proportion of Work Completed December 31, 1912.
Sanitary Contract No. 44, Lateral Sewers, District No. 21.	Dec. 18, 1909.	David Peoples..........	Completed Aug. 15, 1910.
Sanitary Contract No. 45, Lateral Sewers, District No. 27.	Dec. 18, 1909.	David Peoples..........	Completed Aug. 8, 1910.
Storm Water Contract No. 7..	June 2, 1909.	Wm. McCarthy & Co..	Completed Dec. 31. 1909.
Storm Water Contract No. 8..	Sept. 11, 1909.	M. O'Herron & Co.....	Completed Dec. 31. 1909.
Sanitary Contract No. 46, Power-house, Pump House and Land Conduits, Sewage Disposal Plant.............	Feb. 21, 1910.	Ryan & Reilly..........	Completed April 1, 1911.
Sanitary Contract No. 47, Underwater Discharge Conduits, Sewage Disposal Plant.	Mar. 10, 1910.	B. F. Sweeten & Son..	Completed Dec. 2, 1911.
Sanitary Contract No. 48, Lateral Sewers, District 19-B..	Feb. 28, 1910.	Irwin Brothers..........	Completed Oct. 15, 1910.
Sanitary Contract No. 49, Lateral Sewers, District No. 35..	Feb. 28, 1910.	Irwin Brothers..........	Completed Aug. 12, 1910.
Sanitary Contract No. 50, Jones Falls Interceptor, Section No. 2..........................	May 20, 1910.	United Engineering & Construction Co......	Completed May 18, 1911.
Sanitary Contract No. 51, Electrical and Mechanical Equipment, Sewage Disposal Plant.	May 21, 1910.	McCay Engineering Co.	Completed Feb. 20, 1912.

TABLE No. 2—*Continued.*

STATEMENT OF CONTRACTS LET PRIOR TO 1912.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PROPORTION OF WORK COMPLETED DECEMBER 31, 1912.
Sanitary Contract No. 52, Lateral Sewers, District No. 19-A, etc.	June 9, 1910.	Wm. McCarthy & Co.	Completed Jan. 16, 1911.
Sanitary Contract No. 53, Lateral Sewers, District No. 25, etc.	June 23, 1910.	D. V. Ault & Co.	Completed Dec. 7, 1910.
Sanitary Contract No. 54, Trunk Sewers, District No. 48*.	July 28, 1910.	W. H. & C. F. Thompson.	Completed Mar. 10, 1911.
Sanitary Contract No. 55, Lateral Sewers, District No. 14.	Sept. 16, 1910.	B. F. Sweeten & Son.	Completed April 12, 1911.
Sanitary Contract No. 56, Coal and Ash Conveying Plant, Sewage Pumping Station.	Sept. 20, 1910.	Dietz Engineering Co.	95 per cent.
Sanitary Contract No. 57, Lateral Sewers, District No. 34-A.	Nov. 10, 1910.	Whiting-Middleton Construction Co.	Completed July 14, 1911.
Sanitary Contract No. 58, McMechen Street Interceptor.	Nov. 23, 1910.	McCay Engineering Co.	Completed April 3, 1911.
Sanitary Contract No. 59, Electric Wiring, Sewage Pumping Station.	Dec. 16, 1910.	Central Electric Co.	Completed June 26, 1912.
Storm Water Contract No. 9.	Mar. 26, 1910.	David Peoples.	Completed June 27, 1911.
Storm Water Contract No. 10.	July 29, 1910.	George F. Be[illegible]vin.	Completed Dec. 24, 1910.

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*Completion of work originally included in Contract No. 41.

TABLE No. 2—*Continued.*

STATEMENT OF CONTRACTS LET PRIOR TO 1912.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PROPORTION OF WORK COMPLETED DECEMBER 31, 1912.
Sanitary Contract No. 60, Sewage Disposal Plant Laboratory Building..............	June 3, 1911.	D. M. Andrew Co......	Completed April 1, 1912.
Sanitary Contract No. 61, Lateral Sewers, District No. 40-C.........................	Jan. 10, 1911.	B. F. Sweeten & Son...	Completed Nov. 1, 1911.
Sanitary Contract No. 62, Pratt Street Trunk Sewer.........	Mar. 9, 1911.	McCay Engineering Co..	Completed Dec. 18, 1911.
Sanitary Contract No. 63, Lateral Sewers, District No. 15..	Mar. 11, 1911.	Wm. McCarthy & Co...	Completed Nov. 2, 1911.
Sanitary Contract No. 64, Sewage Pumping Station, Waterpiping and Steam Heating...	Mar. 6, 1911.	Wanner Steam and Hot Water Heating Co....	Completed Mar. 31, 1912.
Sanitary Contract No. 65 Sewage Disposal Plant, Sewage Screens	....	....	Bids rejected.
Sanitary Contract No. 66 Lateral Sewers, District No. 36-A.........................	June 15, 1911.	B. F. Sweeten & Son...	Completed Mar. 1, 1912.
Sanitary Contract No. 67, Sewage Pumping Station, Junction of Sewer..............	June 8, 1911.	Martin J. Beach........	Completed Dec. 30, 1911.
Sanitary Contract No. 68, Sewage Disposal Plant, Nozzles for Sprinkling Filters.......	Aug. 21, 1911.	Merritt & Co..........	Completed Jan. 10, 1912.

TABLE No. 2—*Continued.*

STATEMENT OF CONTRACTS LET PRIOR TO 1912.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PROPORTION OF WORK COMPLETED DECEMBER 31, 1912.
Sanitary Contract No. 69, Fixed Screens at Sewage Disposal Works and Sewage Pumping Station	July 27, 1911.	H. S. Roberts	Completed Feb. 20, 1912.
Sanitary Contract No. 70, Sewage Disposal Plant, Pier over Discharge Pipes	....	....	Withdrawn.
Sanitary Contract No. 71, Lateral Sewer in Alley west of Park Heights Avenue, north of Fifth Avenue	Aug. 9, 1911.	G. R. Abbott	Completed Sept. 30, 1911.
Sanitary Contract No. 72, Sewage Pumping Plant, Discharge Piping and Valves	Aug. 17, 1911.	B. F. Sweeten & Son	Completed Nov. 1, 1912.
Sanitary Contract No. 73, Sewage Pumping Station, Electric Generators and Switchboard	Sept. 18, 1911.	Thos. C. Basshor Co.	75 per cent.
Sanitary Contract No. 74, Lateral Sewers, District No. 20-B	Sept. 22, 1911.	B. F. Sweeten & Son	99 per cent.
Sanitary Contract No. 75, High Level Interceptor, Section No. 4	Sept. 25, 1911.	W. H. & C. F. Thompson	93 per cent.

TABLE No. 2—*Concluded.*

STATEMENT OF CONTRACTS LET PRIOR TO 1912.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PROPORTION OF WORK COMPLETED DECEMBER 31, 1912.
Sanitary Contract No. 76, Lateral Sewer in Alley east of Park Heights Avenue, between Third and Fifth Avenues........................	Sept. 25, 1911.	W. H. & C. F. Thompson..................	Completed Nov. 3, 1911.
Sanitary Contract No. 77, Sewage Disposal Plant, Revolving Screens................	Nov. 10, 1911.	D'Olier Engineering Co.	Completed April 30, 1912.
Storm Water Contract No. 11.	Jan. 13, 1911.	Wm. McCarthy & Co...	Completed May 4, 1911.
Storm Water Contract No. 12.	Mar. 30, 1911.	C. B. Clark & Co.......	Completed April 10, 1912.
Storm Water Contract No. 13.	Sept. 22, 1911.	Ryan & Reilly..........	95 per cent.
Storm Water Contract No. 14, Jones Falls Conduits, Section No. 1......................	July 10, 1911.	M. M. Elkan...........	80 per cent.
Storm Water Contract No. 15.	Sept. 9, 1911.	Martin J. Beach........	Completed Nov. 2, 1911.
Storm Water Contract No. 16, Jones Falls Conduits, Section No. 2.....................	Nov. 6, 1911.	Fisher & Carozza.......	23 per cent.

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1912.
Sanitary Contract No. 78, Lateral Sewers, District No. 20-A.	Wm. McCarthy & Co.	Jan. 3, 1912	29,500 lin. ft. 8″ sewer. 3,250 lin. ft. 10″ sewer. 1,100 lin. ft. 12″ sewer. 625 lin. ft. 15″ sewer. 800 lin. ft. 18″ sewer. 500 lin. ft. 22″ sewer. 310 lin. ft. 24″ sewer. 1,575 lin. ft. 27″ sewer. 25 cub. yds. excavation below sub-grade. 20 cub. yds. excavation in rock. 10 cub. yds. brick masonry. 30 cub. yds. concrete masonry. 5,500 lin. ft. 4″ and 6″ underdrain. 812 M. ft. B. M. sheeting, shoring, etc. 2,211 lin. ft. manholes. 220 manhole frames and covers. 1,750 manhole steps. 53 drop connections. 35,000 lin. ft. excavation for house-connections. 35,225 lin. ft. house-connections. 2,505 branches. 17 lamphole frames and covers. 1,100 lin. ft. W. I. pipe from manholes to water mains. 4,000 sq. ft. granolithic pavement relaid. 13,500 lin. ft vitrified block and other pave-	$121,452.00	$135,226.00	Completed Nov. 19, 1912.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1912.
Sanitary Contract No. 79, Sanitary Sewers in Frederick Road.	Martin J. Beach	Feb. 16, 1912	6,050 lin. ft. 8″ sewer. 2,950 lin. ft. 10″ sewer. 1,900 lin. ft. 12″ sewer. 50 lin. ft. 15″ sewer. 2,000 cub. yds. excavation in rock. 15 cub. yds. concrete masonry. 3,000 lin. ft. 4″ and 6″ underdrain. 200 M. ft. B. M. sheeting, shoring, etc. 640 lin. ft. manholes. 54 manhole frames and covers. 42 manhole steps. 14 drop connections. 4,000 lin. ft. excavation for house-connections. 4,390 lin. ft. vitrified pipe and cast-iron pipe house-connections. 505 branches.	$35,527.10	$37,639.35	Completed Aug. 11, 1912.
Sanitary Contract No. 80, Lateral Sewers at Bay View Asylum.	Bond & Bates.	Feb. 2, 1912	460 lin. ft. 8″ sewer. 1,525 lin. ft. 10″ sewer. 2,250 lin. ft. 12″ sewer. 25 cub. yds. excavation below sub-grade. 50 cub. yds. excavation in rock. 10 cub. yds. brick masonry. 70 cub. yds. concrete masonry. 700 lin. ft. 4″ and 6″ underdrain. 57 M. ft. B. M. sheeting, shoring, etc. 240 lin. ft. of manholes. 15 manhole frames and covers. 200 manhole steps. 20 branches	$15,917.95	$19,202.95	Completed Sept. 10, 1912.

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1912.
Sanitary Contract No. 81, High Level Interceptor, Section No. 5.	Ryan & Reilly.	Feb. 23, 1912	14,500 cub. yds. earth excavation. 100 cub. yds. excavation in rock. 650 cub. yds. brick masonry. 5,540 cub. yds. concrete. 1,000 pounds steel bars. 2,300 lin. ft. 6" and 8" underdrain. 310 M. ft. B. M. sheeting, shoring, etc. 14 manhole frames and covers. 240 manhole steps. 135 branches. 4,200 lin. ft. excavation for house-connections. 2,000 lin. ft. vitrified and cast-iron pipe house-connections. 3,200 lin. ft. vitrified pipe standpipe. 1,800 sq. ft. granolithic pavement relaid. 1,700 lin. ft. vitrified block and other pavement relaid. 200 sq. yds. waterproofing.	$171,367.75	$177,911.10	92 per cent.
Sanitary Contract No. 82, House Connections across footways in Districts Nos. 25, 27, 28, 34-A and 35.	Wm. McCarthy & Co.	Jan. 3, 1912	45,250 lin. ft. excavation for house-connections. 49,400 lin. ft. vitrified cast-iron pipe house-connections. 13,000 sq. ft. granolithic pavement relaid. 47,150 lin. ft. vitrified block and other pavement relaid. 800 branches. 10.000 ft. B. M. sheeting, shoring, etc.	$45,381.00	$49,871.00	Completed July 31, 1912.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1912.
Sanitary Contract No. 83, Nozzles for Sprinkling-Beds No. 4 and No. 3.	Pacific Flush Tank Co.	Feb. 3, 1912	1,200 nozzles and deflectors. 1,200 special castings.	$2,509.00	$2,900.00	Completed April 20, 1912.
Sanitary Contract No. 84, Lateral Sewers in Light and Gay Streets.	Ryan & Reilly.	Feb. 23, 1912	680 lin. ft. 10″ sewer. 40 lin. ft. 12″ sewer. 1,080 lin. ft. 15″ sewer. 283 lin. ft. 18″ sewer. 30 cub. yds. extra excavation below sub-grade. 21 cub. yds. concrete masonry. 600 lin. ft. 6″ underdrain. 106 M. ft. B. M. sheeting, shoring, etc. 120 lin. ft. manholes. 8 manhole frames and covers. 10 manhole steps. 1,150 lin. ft. vitrified and cast-iron pipe house-connections. 89 branches.	$12,832.25	$15,056.95	Completed April 30, 1912.

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1912.
Sanitary Contract No. 85, House Connections District No. 14.	Gallagher, Boyle & Muller.	Feb. 20, 1912	18,700 lin. ft. excavation for house-connections. 18,500 lin. ft. vitrified and cast-iron house-connections. 16,000 sq. ft. granolithic pavement relaid. 14,000 lin. ft. vitrified block and other pavement relaid. 10 cub. yds. excavation in rock. 5 M. ft. B. M. sheeting, shoring, etc.	$24,711.50	$27,727.00	Completed July 3, 1912.
Sanitary Contract No. 86, Lateral Sewers in District No. 17.	B. F. Sweeten & Son.	April 15, 1912	2,850 lin. ft. 8″ sewer. 7,170 lin. ft. 10″ sewer. 3,050 lin. ft. 12″ sewer. 2,360 lin. ft. 15″ sewer. 100 cub. yds. excavation below sub-grade. 55 cub. yds. excavation in rock. 50 cub. yds. concrete masonry. 7,000 lin. ft. 4″ and 6″ underdrain. 556 M. ft. B. M. sheeting, shoring, etc. 1,425 lin. ft. manholes. 95 manhole frames and covers. 675 manhole steps. 7,550 lin. ft. excavation for house-connections. 8,000 lin. ft. vitrified and cast-iron pipe house-connections. 355 branches. 150 lin. ft. vitrified pipe standpipe. 8,600 sq. ft. granolithic pavement relaid. 350 lin. ft. vitrified block and other pavement relaid.	$92,424.35	$95,124.35	91 per cent.

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1912.
Sanitary Contract No. 87, Lateral Sewers in District No. 18.	B. F. Sweeten & Son.	May 1, 1912	9,850 lin. ft. 8″ sewer. 20,800 lin. ft. 10″ sewer. 1,100 lin. ft. 12″ sewer. 700 lin. ft. 15″ sewer. 170 lin. ft. 18″ sewer. 600 lin. ft. 20″ sewer. 665 lin. ft. 22″ sewer. 565 lin. ft. 24″ sewer. 4,420 lin. ft. 27″ sewer. 200 cub. yds. excavation below sub-grade. 10 cub. yds. excavation in rock. 110 cub. yds. concrete masonry. 15,000 lin. ft. 4″ and 6″ underdrain. 480 M. ft. B. M. sheeting, shoring, etc. 2,715 lin. ft. manholes. 236 manhole frames and covers. 2,000 manhole steps. 35 drop-connections. 20,820 lin. ft. excavation for house-connections. 22,200 lin. ft. vitrified and cast-iron pipe house-connections. 1,530 branches. 600 lin. ft. vitrified pipe standpipe. 9 lamphole frames and covers. 1,000 lin. ft. gal. W. I. pipe. 28,000 sq. ft. granolithic pavement relaid. 14,100 lin. ft. vitrified block and other pavement relaid.	$163,976.00	$167,726.00	47 per cent.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1912.
Sanitary Contract No. 88, Lateral Sewers in District No. 40-B.	James Ferry & Sons.	May 2, 1912	30,500 lin. ft. 8″ sewer. 1,900 lin. ft. 10″ sewer. 800 lin. ft. 12″ sewer. 100 cub. yds. excavation below sub-grade. 35 cub. yds. concrete masonry. 3,500 lin. ft. 4″ and 6″ underdrain. 506 M. ft. B. M. sheeting, shoring, etc. 1,625 lin. ft. manholes. 185 manhole frames and covers. 1,250 manhole steps. 20,100 lin. ft. excavation for house-connections. 20,490 lin. ft. vitrified and cast-iron pipe house-connections. 2,235 branches. 340 lin. ft. vitrified pipe standpipe. 40 lamphole frames and covers. 700 sq. ft. granolithic pavement relaid. 4,550 lin. ft. vitrified block and other pavement relaid.	$84,904.50	$85,803.00	99 per cent.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1912.
Sanitary Contract No. 89, High Level Interceptor, Section No. 3.	H. C. Brooks & Co.	May 31, 1912	1,100 lin. ft. excavation above sub-grade. 90 cub. yds. extra excavation below sub-grade. 700 cub. yds. excavation in rock. 535 tons cast-iron pipe. 52 tons special castings. 445 cub. yds. concrete masonry. 375 lin. ft. 10" and 24" vitrified pipe. 500 pounds steel bars. 400 lin. ft. 4" and 6" underdrain. 45 M. ft. B. M. sheeting, shoring, etc. 5 special manholes. 5 manhole frames and covers. 45 manhole steps.	$44,840.00	$48,676.50	79 per cent.

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1912.
Sanitary Contract No. 90, Miscellaneous Lateral Sewers.	Ryan & Reilly.	June 7, 1912	13,250 lin. ft. 8″ sewer. 2,100 lin. ft. 10″ sewer. 15 lin. ft. 22″ sewer. 95 lin. ft. 24″ sewer. 10 cub. yds. excavation in rock. 20 cub. yds. concrete masonry. 5,500 lin. ft. 4″ and 6″ underdrain. 135 M. ft. B. M. sheeting, shoring, etc. 710 lin. ft. manholes. 75 manhole frames and covers. 640 manhole steps. 8,850 lin. ft. excavation for house-connections. 8,975 lin. ft. cast-iron and vitrified pipe for house-connections. 896 branches. 4 lamphole frames and covers. 2,025 sq. ft. granolithic pavement relaid. 3,500 lin. ft. vitrified block and other pavement relaid.	$44,240.25	$44,636.40	94 per cent.
Sanitary Contract No. 91, Macadam Roadway at Back River.	Carozza & Lavezza.	July 12, 1912	600 cub. yds. excavation in roadway. 1,600 cub. yds. barrow. 3,100 sq. yds. macadam. 480 lin. ft. brick gutter.	$3,549.20	$3,731.00	Completed Oct. 22, 1912.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1912.
Sanitary Contract No. 92, House-Connections across Footway in District No. 15.	Gallagher, Boyle & Mueller.	June 21, 1912	23,000 lin. ft. excavation for house-connections. 24,500 lin. ft. vitrified and cast-iron pipe for house-connections. 10 cub. yds. excavation in rock. 5 M. ft. B. M. sheeting, shoring, etc. 225 branches. 13,000 sq. ft. granolithic pavement relaid. 18,500 lin. ft. vitrified block and other pavement relaid.	$30,697.50	$41,409.00	Completed Oct. 15, 1912.
Sanitary Contract No. 93, House-Connections across Footways in Districts Nos. 29 and 30.	Wm. McCarthy & Co.	July 16, 1912	56,775 lin. ft. excavation for house-connections. 60,900 lin. ft. vitrified and cast-iron pipe house-connections. 10 cub. yds. excavation in rock. 12 M. ft. B. M. sheeting, shoring, etc. 33,350 sq. ft. granolithic pavement relaid. 48,350 lin. ft. vitrified block and other pavement relaid. 1,276 branches.	$65,249.50	$71,164.75	85 per cent.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1912.
Sanitary Contract No. 94, Miscellaneous Lateral Sewers No. 2.	Gallagher, Boyle & Bryan.	Aug. 17, 1912	8,575 lin. ft. 8″ sewer. 120 lin. ft. 10″ sewer. 1,000 lin. ft. 15″ sewer. 500 lin. ft. 18″ sewer. 320 lin. ft. 20″ sewer. 50 cub. yds. extra excavation below sub-grade. 50 cub. yds. concrete masonry. 1,400 lin. ft. 4″ and 6″ underdrain. 181 M. ft. B. M. sheeting, shoring, etc. 595 lin. ft. manholes. 62 manhole frames and covers. 425 manhole steps. 9,625 lin. ft. excavation for house-connections. 9,120 lin. ft. vitrified and cast-iron pipe house-connections. 692 branches. 2 lamphole frames and covers. 3,600 sq. ft. granolithic pavement relaid. 8,075 lin. ft. vitrified block and other pavement relaid.	$36,121.25	$38,599.75	82 per cent.

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1912.
Sanitary Contract No. 95, High Level Interceptor, Section No. 6.	Ryan & Reilly.	Aug. 6, 1912	125 cub. yds. extra excavation below sub-grade. 100 cub. yds. excavation in rock. 410 cub. yds. brick masonry. 3,195 cub. yds. concrete masonry. 1,000 pounds steel bars. 2,800 lin. ft. 6" and 8" underdrain. 410 M. ft. B. M. sheeting, shoring, etc. 14 manhole frames and covers. 250 manhole steps. 75 branches. 2,660 lin. ft. excavation for house-connections. 2,700 lin. ft. vitrified and cast-iron pipe house-connections. 600 sq. ft. granolithic pavement relaid. 925 lin. ft. vitrified block and other pavement relaid.	$109,383.50	$110,139.25	60 per cent.
Sanitary Contract No. 96, Digging Ditches at Back River.						Bids rejected.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion o. Work Completed Dec. 31, 1912.
Sanitary Contract No. 97, Miscellaneous Lateral Sewers No. 3.	Gallagher, Boyle & Bryan.	Sept. 7, 1912	9,050 lin. ft. 8″ sewer. 210 lin. ft. 10″ sewer. 100 cub. yds. extra excavation below sub-grade. 50 cub. yds. concrete masonry. 6,000 lin. ft. 4″ and 6″ underdrain. 511 M. ft. B. M. sheeting, shoring, etc. 535 lin. ft. manholes. 59 manhole frames and covers. 400 manhole steps. 7,215 lin. ft. excavation for house-connections. 7,495 lin. ft. vitrified and cast-iron pipe house-connections. 688 branches. 8 lamphole frames and covers. 350 lin. ft. gal. W. I. pipe, manhole to water main. 1,400 sq. ft. granolithic pavement relaid. 3,050 lin. ft. vitrified block and other pavement relaid.	$35,690.55	$35,797.30	40 per cent.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1912.
Sanitary Contract No. 98, House-Connections across Footways in District No. 26.	James Ferry & Sons.	Sept. 27, 1912	35,400 lin. ft. excavation for house-connections. 38,175 lin. ft. vitrified and cast-iron pipe house-connections. 16,000 sq. ft. granolithic pavement relaid. 37,575 lin. ft. vitrified block and other pavement relaid. 710 branches. 10 cub. yds. excavation in rock. 8 M. ft. B. M. sheeting, shoring, etc.	$39,846.75	$40,149.25	80 per cent.
Sanitary Contract No. 99, House-Connections in District No. 19-B.	Wm. McCarthy & Co.	Sept. 27, 1912	26,350 lin. ft. excavation for house connections. 28,250 lin. ft. vitrified and cast-iron pipe house-connections. 7,375 sq. ft. granolithic pavement relaid. 14,500 lin. ft. vitrified block and other pavement relaid. 460 branches. 8 M. ft. B. M. sheeting, shoring, etc.	$31,358.00	$33,512.00	63 per cent.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1912.
Sanitary Contract No. 100, Sprinkling Filters, Disposal Plant.	Lane Bros. Co.	Oct. 10, 1912	10,100 cub. yds. excavation. 2,200 cub. yds. embankment. 10 M. ft. B. M. sheeting, shoring, etc. 930 lin. ft. 6″ and 12″ vitrified pipe drain. 824,000 lin. ft. slotted tile slabs. 26,500 cub. yds. concrete masonry. 570 cub. yds. dry rubble masonry. 650,000 pounds reinforcing rods. 655 tons cast-iron bell and spigot pipe. 210 tons special castings. 10,000 pounds pipe hangers. 96 hydrants. 3,498 cast-iron risers. 21 manhole frames and covers. 1 screen chamber house.	$400,772.00	$454,507.50	None.
Sanitary Contract No. 101, Broken Stone, Disposal Plant.	Standard Lime & Stone Co.	Oct. 3, 1912	245,000 cub. yds. broken stone.	$487,550.00	$525,525.00	None.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1912.
Sanitary Contract No. 102, High Level Interceptor, Section No. 7.	C. B. Clark & Co.	Oct. 16, 1912	13,520 cub. yds. excavation in trench. 1,920 cub. yds. excavation in tunnel. 100 cub. yds. excavation below sub-grade. 100 cub. yds. excavation in rock. 505 cub. yds. brick masonry. 3,700 cub. yds. concrete masonry. 1,000 pounds steel bars. 2,800 lin. ft. 6″ and 8″ underdrain. 475 M. ft. B. M. sheeting, shoring, etc. 13 manhole frames and covers. 250 manhole steps. 30 branches. 1,680 lin. ft. excavation for house-connections. 1,140 lin. ft. house-connections. 600 sq. ft. granolithic pavement relaid. 1,550 lin. ft. vitrified block and other pavement relaid.	$117,503.10	$124,551.50	2 per cent.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1912.
Sanitary Contract No. 103, Locust Point Trunk Sewer, Section No. 1.	Ryan & Reilly.	Oct. 16, 1912	4,190 lin. ft. 30″ sewer. 1,200 lin. ft. 8″ sewer. 40 cub. yds. concrete masonry. 2,200 lin. ft. 4″ and 6″ underdrain. 230 M. ft. B. M. sheeting, shoring, etc. 200 lin. ft. manholes. 17 manhole frames and covers. 115 manhole steps. 1,650 lin.ft. excavation for house-connections. 1,945 lin. ft. house-connections. 123 branches.	$38,733.65	$39,047.25	25 per cent.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1912.
Sanitary Contract No. 104, Lateral Sewers in District No. 40-A.	Wm. McCarthy & Co.	Nov. 6, 1912	23,500 lin. ft. 8″ sewer. 2,000 lin. ft. 10″ sewer. 2,775 lin. ft. 12″ sewer. 1,100 lin. ft. 15″ sewer. 100 cub. yds. excavation below sub-grade. 70 cub. yds. concrete masonry. 3,000 lin. ft. 4″ and 6″ underdrain. 283 M. ft. B. M. sheeting, shoring, etc. 1,625 lin. ft. manhole. 192 manholes. 750 manhole steps. 11,850 lin. ft. excavation for house-connections. 12,000 lin. ft. vitrified and cast-iron pipe house-connections. 1,600 branches. 20 lamp hole frames and covers. 375 sq. ft. granolithic pavement relaid. 1,275 lin. ft. vitrified block and other pavement relaid.	$80,289.75	$87,472.25	10 per cent.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1912.
Sanitary Contract No. 105, House-Connections across Footways in Districts Nos. 36-A and 40-A.	Carozza & Lavezza.	Nov. 30, 1912	24,050 lin. ft. excavation for house-connections. 25,840 lin. ft. vitrified and cast-iron pipe house-connections. 6,750 sq. ft. granolithic pavement relaid. 22,360 lin. ft. vitrified block and other pavement relaid. 280 branches. 7 M. ft. B. M. sheeting, shoring, etc.	$20,768.45	$21,531.25	15 per cent.
Sanitary Contract No. 106, House-Connections across Footways in Districts Nos. 19-A and 21.	Wm. McCarthy & Co.	Dec. 30, 1912	34,575 lin. ft. excavation for house-connections. 36,715 lin. ft. vitrified and cast-iron pipe house-connections. 9,700 sq. ft. granolithic pavement relaid. 32,100 lin. ft. vitrified block and other pavement relaid. 515 branches. 9 M. ft. B. M. sheeting, shoring, etc.	$37,834.25	$40,092.90	None.

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1912.
Storm Water Contract No. 17.	N. A. Middleton & Co.	Jan. 2, 1912	170 cub. yds. concrete masonry. 18,000 pounds iron castings. 30,000 pounds reinforcing steel. 3 M. ft. B. M. sheeting, shoring, etc.	$5,439.50	$6,151.00	Completed July 6, 1912.
Storm Water Contract No. 18.	Wm. McCarthy & Co.	Jan. 3, 1912	18,820 lin. ft. 30" to 48" circular drain. 18,945 lin. ft. 15" to 30" vitrified pipe drain. 8,150 lin. ft. 12" to 18" inlet connections. 13 cub. yds. brick masonry. 340 cub. yds. concrete masonry. 50,000 pounds steel bars. 3,400 lin. ft. 4" to 8" underdrain. 115 M. ft. B. M. sheeting, shoring, etc. 1,100 cub. yds. excavation in rock. 136 manhole frames and covers. 1,020 lin. ft. manholes. 700 manhole steps. 360 inlets. 272 heads for inlets. 500 lin. ft. new granite curb. 800 lin. ft. curb removed and reset. 100 sq. yds. gutters and cobble pavement removed and reset.	$111,894.90	$120,093.64	Completed Sept. 29, 1912.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1912.
Storm Water Contract No. 19.	B. F. Sweeten & Son.	Mar. 18, 1912	2,715 lin. ft. 33″ and 36″ circular drain. 14,855 lin. ft. 12″ to 30″ vitrified pipe drain. 5,225 lin. ft. 12″ to 18″ inlet connections. 302 cub. yds. concrete masonry. 200 pounds steel bars. 200 pounds expanded metal for reinforcing. 2,500 lin. ft. 4″ and 6″ underdrain. 80 M. ft. B. M. sheeting, shoring, etc. 50 cub. yds. excavation in rock. 91 manhole frames and covers. 620 lin. ft. manholes. 475 manhole steps. 176 inlets. 169 heads for inlets. 1,000 lin. ft. new granite curb. 200 lin. ft. curb removed and reset.	$51,284.85	$59,405.95	92 per cent.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1912.
Storm Water Contract No. 20.	Ryan & Reilly.	April 25, 1912	30 lin. ft. 30″ circular drain. 20 lin. ft. 24″ flat top drain. 4,010 lin. ft. 15″ to 24″ vitrified pipe drain. 1,860 lin. ft. 12″ to 15″ inlet connections. 122 cub. yds. concrete masonry. 100 pounds expanded metal for reinforcing. 300 lin. ft. 4″ underdrain. 21 M. ft. B. M. sheeting, shoring, etc. 31 manhole frames and covers. 196 lin. ft. manholes. 150 manhole steps. 79 inlets. 74 heads for inlets. 400 lin. ft. new granite curb. 400 lin. ft. curb removed and reset.	$18,895.00	$19,217.55	Completed Nov. 1, 1912.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1912.
Storm Water Contract No. 21.	C. B. Clark & Co.	July 13, 1912	12,075 lin. ft. 30″ to 48″ circular drain. 12,810 lin. ft. 12″ to 30″ vitrified pipe drain. 30 lin. ft. 24″ flat top drain. 5,585 lin. ft. 12″ to 18″ inlet connections. 103 cub. yds. brick masonry. 995 cub. yds. concrete masonry. 32,000 pounds steel bars. 5,100 pounds expanded metal for reinforcing. 4,100 lin. ft. 4″ to 8″ underdrain. 225 M. ft. B. M. sheeting, shoring, etc. 4,800 lin. ft. lumber driven and cut off. 350 cub. yds. excavated in rock. 85 manhole frames and covers. 590 lin. ft. manholes. 425 manhole steps. 640 inlets. 22 catch-basins. 215 heads for inlets and catch-basins. 1,500 lin. ft. new granite curb. 550 lin. ft. curb removed and reset.	$103,316.45	$103,771.55	87 per cent.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1912.
Storm Water Contract No. 22.	B. F. Sweeten & Son.	Oct. 8, 1912	28,920 lin. ft. 30″ to 48″ circular drain. 11,680 lin. ft. 12″ to 30″ vitrified pipe drain. 430 lin. ft. 52″ x 36″ reinforced concrete drain. 50 lin. ft. 24″ flat top drain. 7,300 lin. ft. 12″ to 18″ inlet connections. 65 cub. yds. brick masonry. 1,265 cub. yds. concrete masonry. 42,000 pounds steel bars. 10,000 pounds expanded metal for reinforcing. 4,200 lin. ft. 4″ to 8″ underdrain. 325 M. ft. B. M. sheeting, shoring, etc. 500 lin. ft. lumber driven and cut off. 115 manhole frames and covers. 860 lin. ft. manholes. 530 manhole steps. 762 inlets. 100 catch-basins. 258 heads for inlets and catch-basins. 1,500 lin. ft. new granite curb. 550 lin. ft. curb removed and reset.	$164,972.72	$165,251.35	7 per cent.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1912.
Storm Water Contract No. 23.	Wm. McCarthy & Co.	Oct. 25, 1912	1,368 lin. ft. 15″ to 24″ vitrified pipe drain. 770 lin. ft. 12″ to 15″ inlet connections. 100 lin. ft. 4″ underdrain. 6 M. ft. B. M. sheeting, shoring, etc. 15 manhole frames and covers. 87 lin. ft. manholes. 75 manhole steps. 23 inlets. 11 heads for inlets.	$5,990.27	$7,593.03	18 per cent.
Storm Water Contract No. 24.	B. F. Sweeten & Son.	Dec. 27, 1912	28,415 lin. ft. 30″ to 42″ circular drain. 22,530 lin. ft. 15″ to 30″ vitrified pipe drain. 45 lin. ft. 24″ flat top drain. 1,520 lin. ft. 15″ to 30″ circular drain. 11,075 lin. ft. inlet connections. 55 cub. yds. brick masonry. 610 cub. yds. concrete masonry. 2,600 pounds steel bars. 400 pounds expanded metal for reinforcing. 3,500 lin. ft. 4″ to 8″ underdrain. 350 M. ft. B. M. sheeting, shoring, etc. 500 cub. yds. excavation in rock. 200 manhole frames and covers. 1,420 lin. ft. manholes. 1,125 manhole steps. 406 inlets. 365 heads for inlets. 1,500 lin. ft. new granite curb. 1,000 lin. ft. curb removed and reset.	$166,194.00	$187,244.15	None.

TABLE No. 3—*Concluded.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1912, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1912.
Storm Water Contract No. 25.	James Ferry & Sons.	Dec. 31, 1912	47,950 cub. yds. excavation in open trench for 12′ 0″ x 12′ 3″ horseshoe drain. 1,650 lin. ft. excavation in tunnel for 12′ 0″ x 12′ 3″ horseshoe drain. 10 cub. yds. excavation in rock. 625 cub. yds. brick masonry. 13,090 cub. yds. concrete masonry. 555 M. ft. B. M. sheeting, shoring, etc. 7 manhole frames and covers. 60 manhole steps. 245 lin. ft. manholes. 5,000 pounds steel bars. 4,230 lin. ft. 6″ and 8″ underdrain.	$279,990.25	$283,562.25	None.

TABLE No. 4.

LENGTHS OF SANITARY SEWERS OF THE VARIOUS SIZES AND MATERIALS CONSTRUCTED TO DECEMBER 31, 1912.

SIZE AND SHAPE.	MATERIAL.	CONSTRUCTED PRIOR TO 1912. LINEAR FEET.	CONSTRUCTED DURING 1912. LINEAR FEET.	CONSTRUCTED TO DEC. 31, 1912. LINEAR FEET.
11′ x 12′ 3″ Horseshoe	Brick and Concrete	26,351.80		26,351.80
10′ 9″ x 12′ Horseshoe	Brick and Concrete	3,879.21		3,879.21
100″ Circular	Brick and Concrete	5,109.28		5,109.28
99″ Circular	Brick and Concrete	4,610.45		4,610.45
84″ Circular	Brick and Concrete	359.56	180.00	539.56
82″ Circular	Brick and Concrete	400.00	2,699.00	3,099.00
80″ Circular	Brick and Concrete	727.00	2,586.00	3,313.00
76″ Circular	Brick and Concrete	633.60		633.60
75″ Circular	Brick and Concrete	1,594.92		1,594.92
74″ Circular	Brick and Concrete	1,931.00		1,931.00
72″ Circular	Brick and Concrete		1,473.00	1,473.00
66″ Circular	Brick and Concrete	2,011.67		2,011.67
64″ Circular	Brick and Concrete	2,488.75		2,488.75
61″ Circular	Brick and Concrete		829.00	829.00
60″ Circular	Brick and Concrete	5,225.18		5,225.18
56″ Circular	Brick and Concrete	367.17		367.17
57″ Circular	Brick and Concrete	742.90		742.90
55″ Circular	Brick and Concrete	963.88	216.00	1,179.88
52″ Circular	Brick and Concrete	893.72		893.72
51″ Circular	Brick and Concrete	2,054.98		2,054.98
50″ Circular	Brick and Concrete	791.78		791.78
48″ Circular	Brick and Concrete	869.94		869.94
45″ Circular	Brick and Concrete	1,440.00		1,440.00
42″ Circular	Cast-Iron Pipe	10,570.00	1,409.63	11,979.63
36″ Circular	Cast-Iron Pipe		685.00	685.00
36″ Circular	Brick and Concrete	63.61		63.61
30″ Circular	Brick and Concrete	104.20	500.00	604.20

LENGTHS OF SANITARY SEWERS OF THE VARIOUS SIZES AND MATERIALS CONSTRUCTED TO DECEMBER 31, 1912.

Size and Shape.	Material.	Constructed Prior to 1912. Linear Feet.	Constructed During 1912. Linear Feet.	Constructed to Dec. 31, 1912. Linear Feet.
30″ Circular	Terra-Cotta Pipe	89.20	....	89.20
27″ Circular	Brick and Concrete	3,426.27	48.33	3,474.60
27″ Circular	Terra-Cotta Pipe	....	3,012.50	3,012.50
24″ Circular	Terra-Cotta Pipe	7,924.12	1,777.34	9,701.46
24″ Circular	Cast-iron Pipe	297.36	....	297.36
22″ Circular	Terra-Cotta Pipe	10,789.61	2,018.20	12,807.81
20″ Circular	Terra-Cotta Pipe	4,800.50	1,652.33	6,452.83
18″ Circular	Terra-Cotta Pipe	7,436.86	1,767.98	9,204.84
16″ Circular	Cast-Iron Pipe	1,240.44	....	1,240.44
15″ Circular	Terra-Cotta Pipe	18,124.62	7,533.39	25,658.01
12″ Circular	Terra-Cotta Pipe	17,888.00	10,288.14	28,096.14
10″ Circular	Terra-Cotta Pipe	48,647.10	32,530.90	81,178.02
10″ Circular	**Cast-Iron Pipe**	24.00	835.50	859.50
8″ Circular	Cast-Iron Pipe	492.40	....	492.40
8″ Circular	Terra-Cotta Pipe	373,946.01	182,686.23	556,632.24
Total length		569,228.09	254,728.46	823,956.55
House-connections		222,498.82	342,299.97	564,798.79
Grand total		791,726.91	597,028.43	1,388,755.34
Manholes		2,923	1,394	4,317
Lampholes		278	147	425
Spurs		31,413	17,243	48,656

TABLE No. 5.

LENGTH OF STORM-WATER DRAINS OF THE VARIOUS SIZES AND MATERIALS CONSTRUCTED TO DECEMBER 31, 1912.

Size.	Materials.	Constructed Prior to 1912. Linear Feet.	Constructed During 1912. Linear Feet.	Total to Dec. 31, 1912. Linear Feet.
Double Rectangular, 84″ x 60″	Concrete and Brick (Reinf.)	108.30		108.30
Double Rectangular, 69″ x 50″	Concrete and Brick (Reinf.)	2,856.91		2,856.91
Rectangular, 14′ x 7′ 6″	Concrete and Brick (Reinf.)	367.00	80.80	447.80
Rectangular, 72″ x 51″	Concrete and Brick (Reinf.)		764.30	764.30
Rectangular, 69″ x 36″	Concrete and Brick (Reinf.)		208.00	208.00
Rectangular, 66″ x 45″	Reinforced Concrete	1,470.30		1,470.30
Rectangular, 60″ x 42″	Concrete and Brick (Reinf.)	785.90		785.90
Rectangular, 60″ x 30″	Concrete and Brick (Reinf.)	76.79		76.79
Horseshoe, 138″ x 132″	Concrete and Brick (Reinf.)	125.13		125.13
Horseshoe, 138″ x 99″	Concrete and Brick (Reinf.)	260.00	1,952.22	2,212.22
Horseshoe, 114″	Concrete and Brick	244.65		244.65
Horseshoe 87″	Concrete and Brick	1,013.00	287.28	1,300.28
Double Line, 30″	Cast-Iron Pipe	645.17		645.17
Circular, 114″	Concrete and Brick	1,112.69		1,112.69
Circular, 96″	Concrete and Brick	3,451.55		3,451.55
Circular, 72″	Concrete and Brick	1,259.91		1,259.91
Circular, 69″	Concrete and Brick	1,926.04		1,926.04
Circular, 66″	Concrete and Brick	169.35		169.35
Circular, 62″	Concrete and Brick (Reinf.)	245.64		245.64
Circular, 60″	Concrete and Brick	163.49	69.60	233.09
Circular, 57″	Concrete and Brick	83.47		83.47
Circular, 54″	Concrete and Brick (Reinf.)	995.32	757.73	1,753.05

TABLE No. 5—*Continued.*

LENGTH OF STORM-WATER DRAINS OF THE VARIOUS SIZES AND MATERIALS CONSTRUCTED TO DECEMBER 31, 1912.

Size.	Materials.	Constructed Prior to 1912. Linear Feet.	Constructed During 1912. Linear Feet.	Total to Dec. 31, 1912. Linear Feet.
Circular, 48"	Cast-Iron Pipe	41.99		41.99
Circular, 48"	Brick	1,453.27		1,453.27
Circular, 48"	Concrete and Brick	702.34	12.50	714.84
Circular, 48"	Concrete	1,054.83	569.42	1,624.25
Circular, 45"	Concrete	465.00	6.51	471.51
Circular, 42"	Cast-Iron Pipe	34.35		34.35
Circular, 42"	Brick	1,689.96		1,689.96
Circular, 42"	Concrete and Brick	1,751.59		1,751.59
Circular, 42"	Concrete	2,282.52	1,849.95	4,132.47
Circular, 36"	Cast-Iron Pipe		24.00	24.00
Circular, 36"	Brick	600.81	48.16	648.97
Circular, 36"	Concrete and Brick	7,017.89	206.02	7,223.91
Circular, 36"	Concrete	6,055.19	4,959.24	11,014.43
Circular, 33"	Brick	38.23	6.12	44.35
Circular, 33"	Concrete and Brick	5,299.37	2,705.24	8,004.61
Circular, 33"	Concrete		2,642.60	2,642.60
Circular, 30"	Cast-Iron Pipe	914.33	114.00	1,028.33
Circular, 30"	Brick	190.50	45.17	235.67
Circular, 30"	Concrete and Brick	8,022.12	2,274.39	10,296.51
Circular, 30"	Vitrified Pipe	944.00	1,508.19	2,452.19
Circular, 30"	Concrete	4,522.68	4,849.09	9,371.77

TABLE No. 5—*Concluded.*

LENGTH OF STORM-WATER DRAINS OF THE VARIOUS SIZES AND MATERIALS CONSTRUCTED TO DECEMBER 31, 1912.

SIZE.	MATERIALS.	CONSTRUCTED PRIOR TO 1912. LINEAR FEET.	CONSTRUCTED DURING 1912. LINEAR FEET.	TOTAL TO DEC. 31, 1912. LINEAR FEET.
Circular, 24"	Cast-Iron Pipe	494.13	5.87	500.00
Circular, 24"	Terra-Cotta Pipe	31,884.04	15,822.52	47,706.56
Circular, 20"	Cast-Iron Pipe	371.63	39.20	410.83
Circular, 20"	Terra-Cotta Pipe	11,195.87	7,222.85	18,418.72
Circular, 18"	Terra-Cotta Pipe	25,653.67	15,744.12	41,397.79
Circular, 18"	Cast-Iron Pipe	....	26.50	26.50
Circular, 15"	Terra-Cotta Pipe	22,268.18	12,800.43	35,068.61
Circular, 15"	Cast-Iron Pipe	....	38.70	38.70
Circular, 12"	Cast-Iron Pipe	5,771.87	325.70	6,597.57
Circular, 10"	Cast-Iron Pipe	....	190.00	190.00
Circular, 8"	Cast-Iron Pipe	....	156.93	156.93
Circular, 6"	Cast-Iron Pipe	....	219.84	219.84
Jones Falls Conduits	Reinforced Concrete	285.00	2,304.00	2,589.00
Horseshoe, 96" x 93"	Concrete and Brick	56.00	....	56.00
Inlet Connections, 10" to 20"	Terra-Cotta Pipe	35,493.62	24,675.97	60,169.59
Grand totals	....	193,915.59	106,013.16	299,928.75
Inlets and Catch Basins		1,244	842	2,086
Manholes and Drop Wells		977	492	1,469

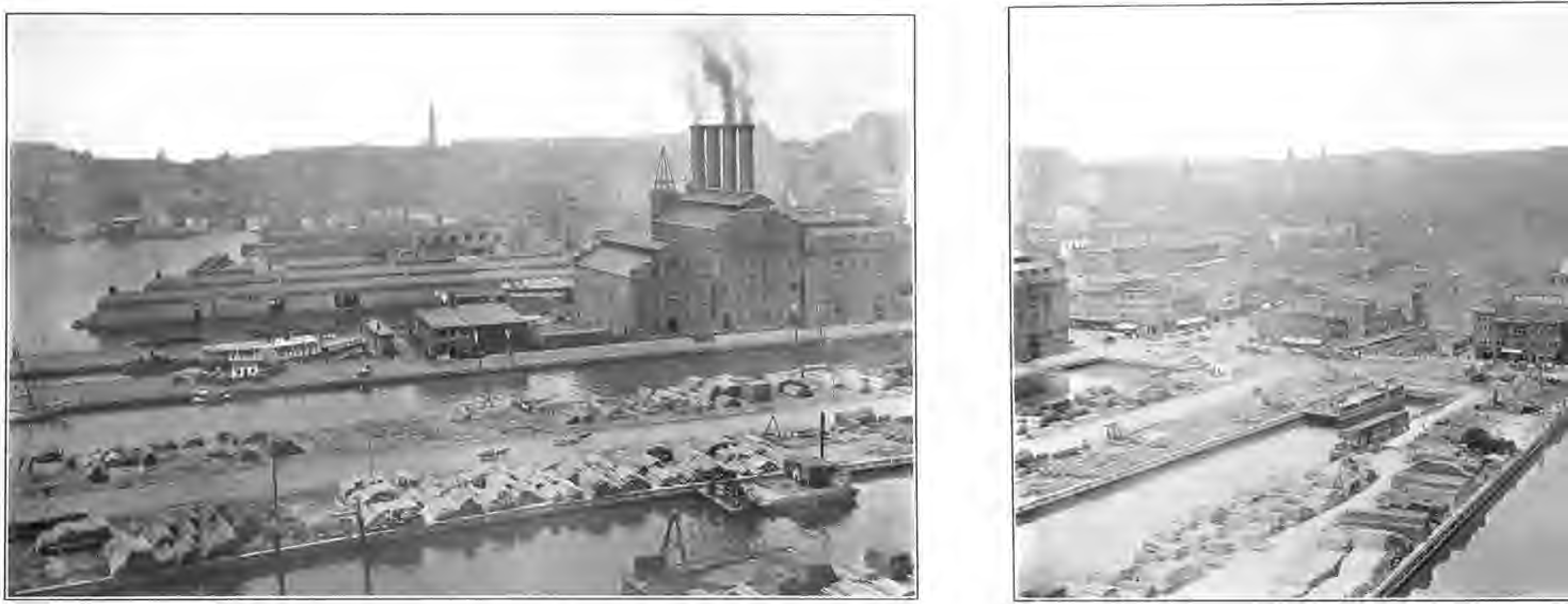
Annual Report
of the
Sewerage Commission
of the
City of Baltimore

1911

BALTIMORE
MEYER & THALHEIMER
PUBLIC PRINTER

1912

ENT MANTEL CO.



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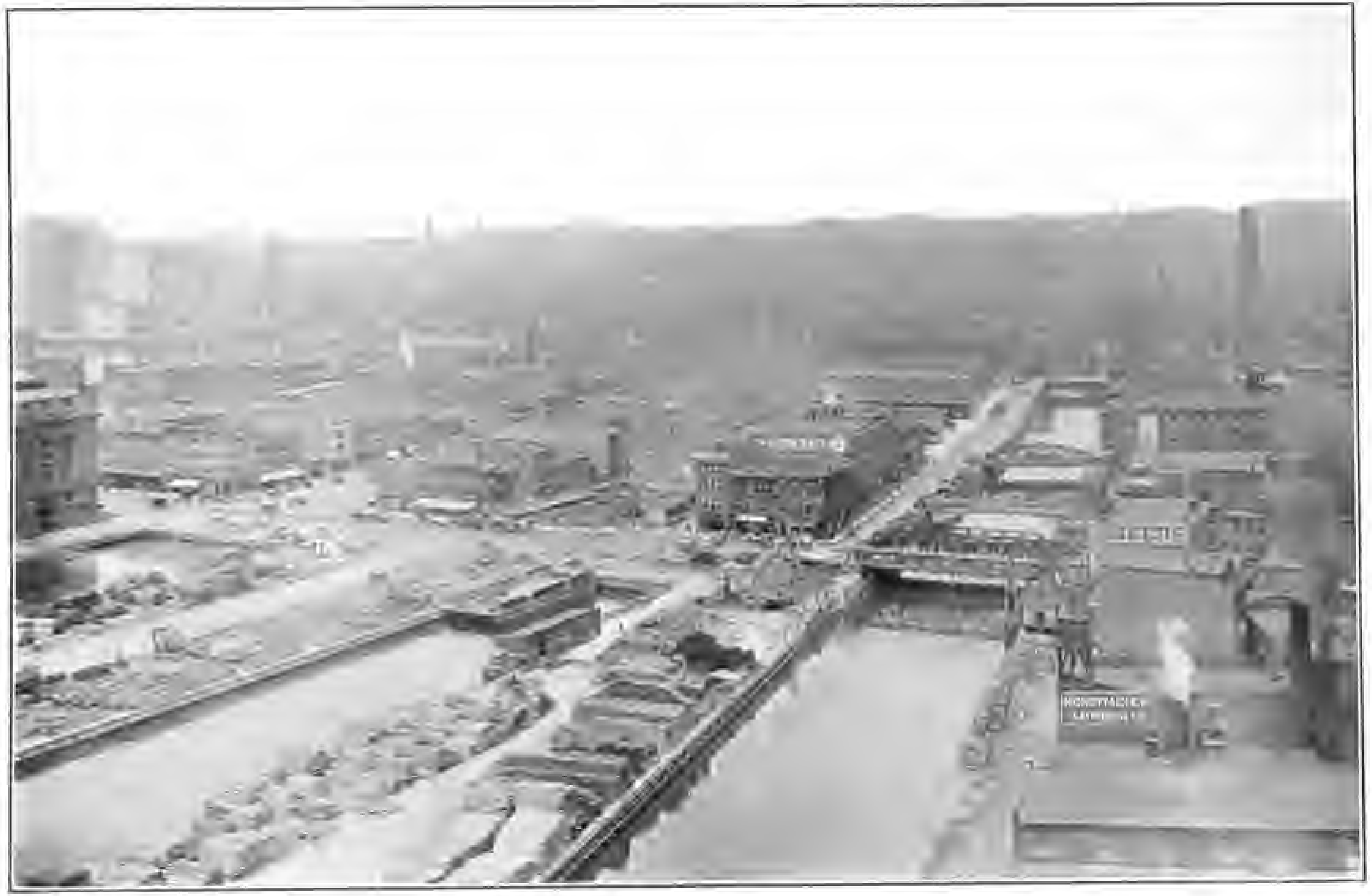

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SEWERAGE COMMISSION
OF THE
CITY OF BALTIMORE
AMERICAN BUILDING

BALTIMORE, December 31, 1911.

HON. JAMES H. PRESTON,
Mayor of Baltimore.

SIR:

As required by Section 1, Chapter 349, of the Acts of General Assembly of Maryland of 1904, this Commission submits herewith a report of its work and expenditures during 1911.

By the death of Brigadier-General Peter Leary, Jr., (February 13, 1911) the Commission lost a most efficient member, and the City a public servant always alive to its interests, and faithful in the performance of his duties. As Chairman of the Commission from its organization until his death, he had much to do with shaping its policies and exerted a beneficial influence upon the members. He regarded his position as one of trust, and was scrupulously exact in its administration. A man of kind disposition, courteous manner, never speaking ill of any, he won the regard of those with whom he came in contact, and his death was deeply deplored.

On March 7, 1911, the Commission elected Charles England, Chairman, vice General Leary, deceased.

On April 18, 1911, Wm. W. McIntire was appointed to fill a vacancy on the Commission caused by the death of General Leary.

FINANCIAL REPORT.

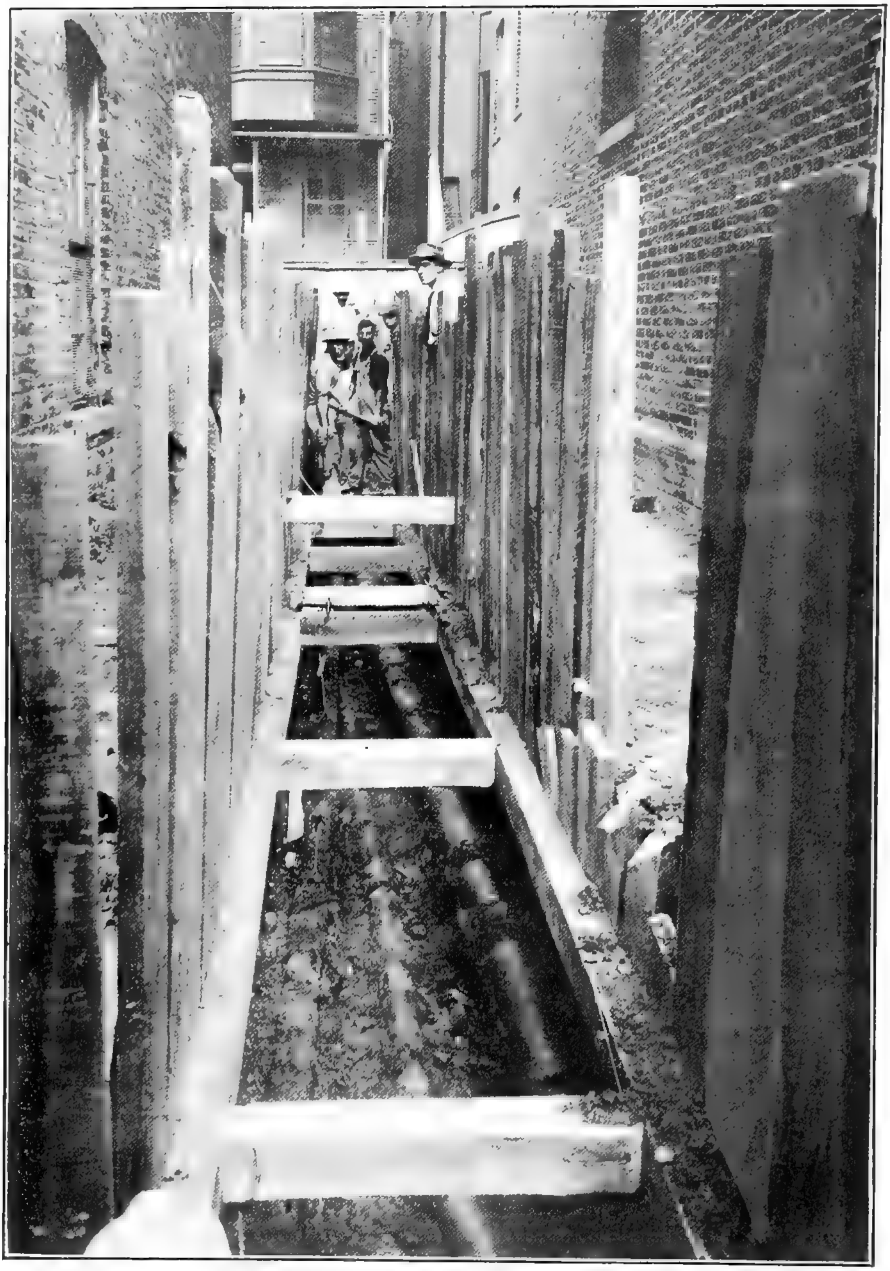
The books and accounts of the Commission were duly examined by the Baltimore Audit Company, from the date of the last audit to the close of business December 31, 1911, and the Audit Company reported to the Commission as follows:

"We have completed, under our contract with the Mayor and City Council of Baltimore, an audit and examination of your books and accounts for the year 1911, which included the examination of original vouchers in the Comptroller's office in the City Hall. The schedules as per list attached give the same information that has been furnished the Commission in previous years."

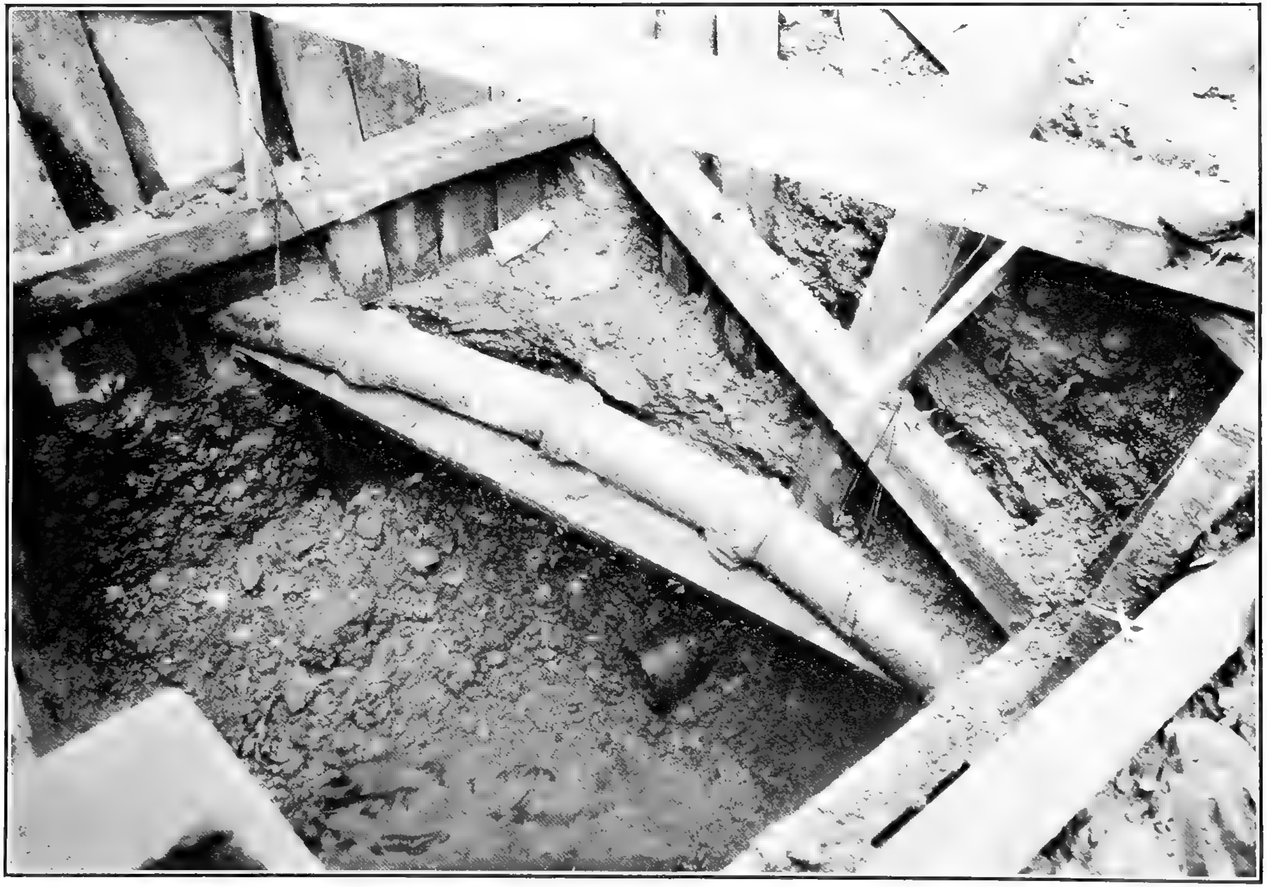
"We have, during the course of our examination, made the usual complete audit of the details of your books of original entry, and have found everything in good order."

There has been submitted to the City Comptroller a complete and detailed statement of disbursements for the year 1911, which are summarized as follows:

Construction	$1,165,208 32
Construction expenses	80,574 33
Construction salaries	126,425 36
Administrative salaries	26,537 64
Special expenses	27,237 65
	$1,425,983 30
CREDIT—	
By amount derived from sale of plans and supervision of private drain construction, rent, old material, etc.	4,134 74
Net amount expended 1911	$1,421,848 56



SANITARY SEWER TRENCH IN NARROW ALLEY.
Showing Obstructions Encountered.



PRIVATE DRAIN IN MANHOLE EXCAVATION.
Showing Original Crooked Alignment.

UNDERGROUND OBSTRUCTIONS.

Early in the year the Chief Engineer called attention of the Commission to the cost of digging test pits, authority having been given him, from time to time, to make these preliminary tests. Experience proved that this method of gathering information regarding underground obstructions and conditions, and furnishing data to prospective bidders, resulted in a considerable saving in the bid price; therefore, the Commission directed that the making of test pits be continued wherever desirable. Procuring this information increases the percentage of engineering expenses materially, but in the end it has proven to be a wise and economical expenditure. It is desirable to avoid underground obstructions whenever practical. Many of the pipes in the streets are old, and, when uncovered, are found to be in bad condition and frequently fall to pieces and must be replaced with new pipe. While contractors are held strictly to the requirements of the specifications, there is an equity in some instances and a contractor should not always be required to replace an old pipe with a new one, hence the avoidance of these obstructions and the information given in advance is a great saving to the City.

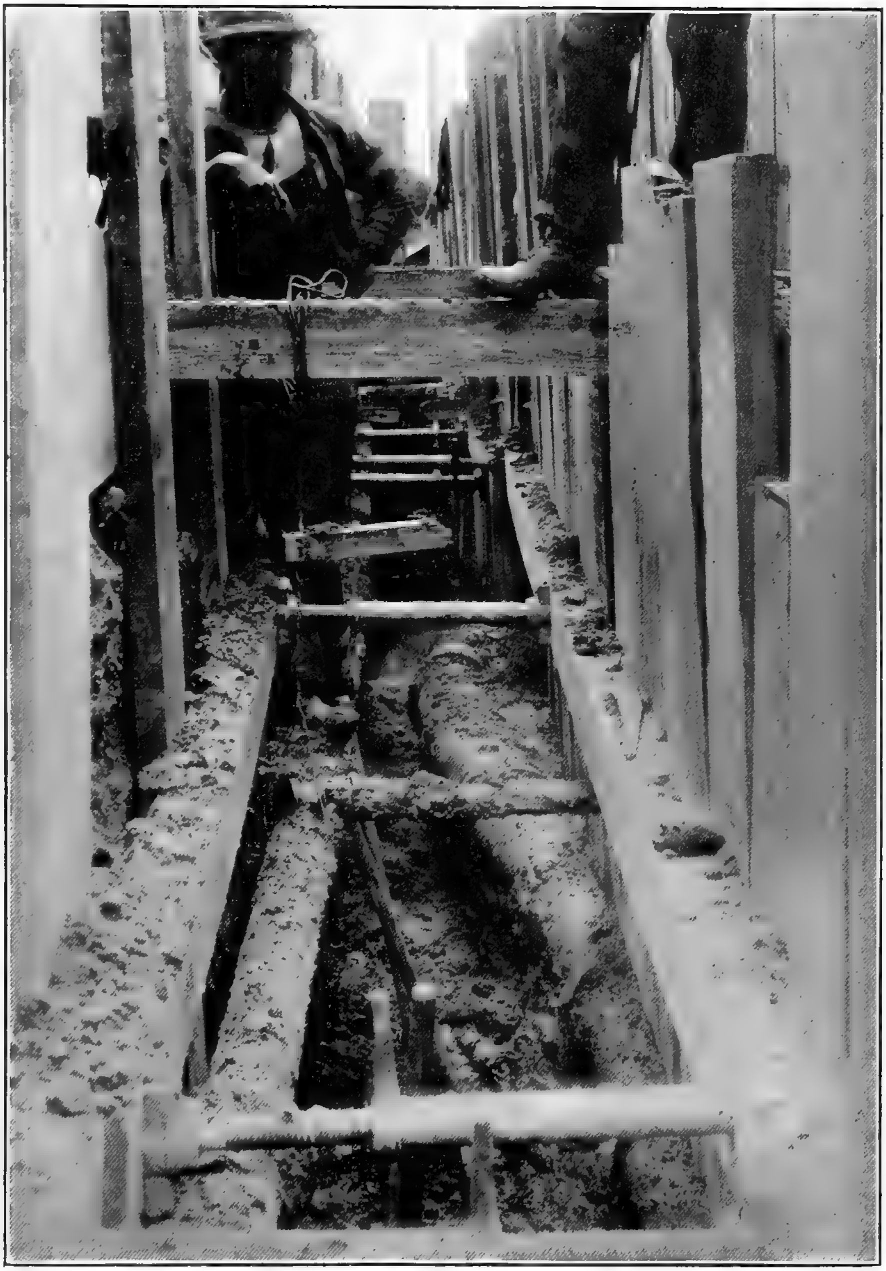
SEWERAGE LOAN NO. 2.

At the City election in May, 1911, the voters ratified the Ordinance of the Mayor and City Council, submitting to them the Act passed by the Legislature in 1910, authorizing the issuance of stock by the City to an amount not exceeding ten millions of dollars, additional money for the completion of the Sewerage System. The very large vote by which this ordinance was ratified, indicated that the people of Baltimore had, since the commencement of the construction of the sewers by this Commission, become more fully convinced of the necessity of a prompt completion of the work, and endorsed the methods employed in carrying on this important improvement.

The Act providing for the "New Sewerage System Fund No. 2" contained provisions not included in the first Enabling Act, among which are the requirements that the Commission shall locate its sewers, intended for house connection, in the alleys in the rear of the houses wherever practicable, and that the City shall acquire, by purchase, private sewers whenever suitable and of sufficient capacity to drain houses connected with such sewers, and such other houses as may in the future be built abutting on that part of the alley or street, at a sum not exceeding 50 per cent. of what would be the cost of constructing a sewer of the same kind in the same place. The requirement to construct sewers in alleys whenever practicable will, in many instances, involve greatly increased cost, but the Legislature, City Council and the voters so emphatically approved of these provisions, that the Commission is acting in full accord with the letter and spirit of the Act.

HOUSE CONNECTIONS.

The Commission submitted to the City Solicitor the question whether, under the Acts of the Legislature and City Ordinances, in cases where the sewer connections were made in the front of houses, an iron pipe could be carried through the wall, thereby giving the property-owner a connection inside of the building line. The City Solicitor expressed the opinion that if there were any doubt about the Commission having authority to carry connections through the walls of a house when the connection is being made from the front or side, the City certainly had power to provide for doing so by Ordinance under Section 6 of the Charter, and accordingly an Ordinance was promptly prepared by him, passed by the City Council and adopted December 4, 1911, authorizing and directing the Sewerage Commission to carry connecting pipes to the inside of the walls of buildings on the building line, and forbidding the owners of such property from interfering with the Sewerage



EIGHT-INCH PRIVATE DRAIN IN SANITARY SEWER TRENCH.
Showing Crooked Alignment.

Commission in the carrying of such pipes to the inside wall of their buildings and providing a penalty for interfering. While this will add to the cost of sewer construction, it will be a greater saving to the property-owners generally by having connecting pipes carried through the house wall, instead of stopping at the outside, when the Commission's contractors have the trench open and the sewers being laid across the sidewalk to the building line, with the further advantage to the property-owner of having the pipe exposed and ready for his connection.

Actual construction commenced upon the Sewerage System October 22, 1906, and from that time it has been pushed steadily forward. Soon after the work began storm-water sewers were put into service in many sections of the City, relieving unsatisfactory conditions of long standing, and, in some instances, saving the City from damage suits. The utilization of the sanitary sewers, however, was not possible until the Outfall Sewer was completed and a section of the Disposal Plant ready for handling the sewage. This was accomplished within the time specified by the Chief Engineer, and on October 27, 1911, the first house (1701 Jefferson street) was connected, and the caring for the sanitary sewage of the City began. Thus the point in sewerage construction was reached from which the Commission could look forward with more certainty to the completion of the work as planned, and the City of Baltimore will have the most modern and practical sewerage system of the world.

PUMPING STATION BUILDING.

With the exception of some minor details, deferred pending the erection of the pumps, the Pumping Station at East Falls Avenue was completed in August, 1911. The solidity of this building, and its appropriate appearance and arrangement, reflect great credit upon the Chief Engineer and Architect, who at times labored under many disadvantages, because of unreasonable interference. When the pumps are in operation, this plant will be interesting to all our citizens, also a matter of pride, and those who may have an improper impression of its construction, because of unwarranted statements, will be given an opportunity of seeing it as it is, and not as it may have been misrepresented.

FLOODED DISTRICTS.

On August 25, the City was subjected to a rainstorm of unusual volume, the precipitation in a half hour being very heavy, taxing all sewers in the City to their capacity, and doing considerable damage at Leadenhall and Ostend Streets, Roland Avenue, also North and Slingluff Avenues. The Mayor called attention of the Commission to conditions existing at these points, and the Chief Engineer was requested to make a complete investigation. The work necessary for the relief of conditions at these points, as well as in other sections of the City, was contemplated in the original plans for storm-water sewers, but could not be taken up until after January 1, 1912, at which time Sewerage Fund No. 2 will be available. It is intended to press as vigorously as possible work in all the sections referred to.

SEWERS IN THE ANNEX.

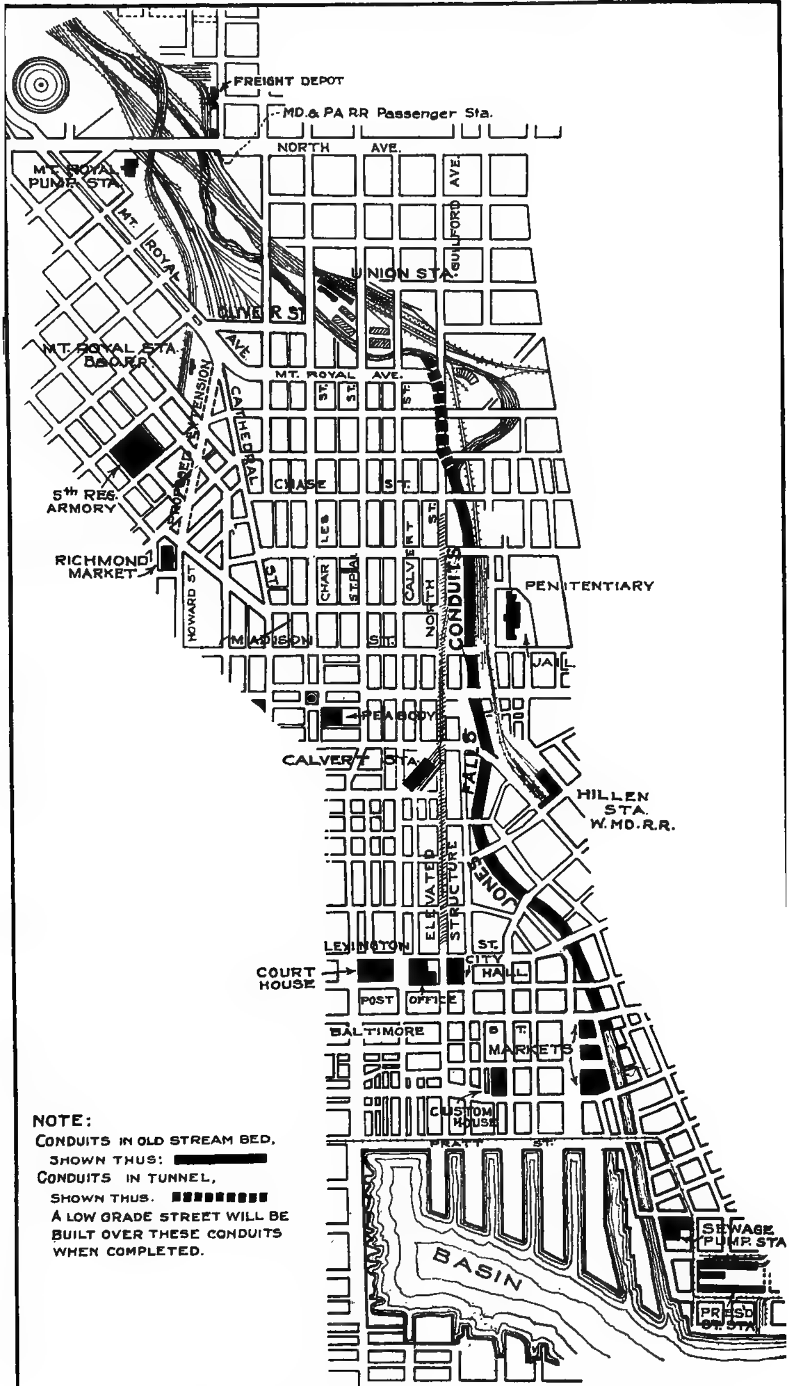
The rapid development in the Annex, and prospect of extensive street improvement in that section, possible under the Annex Paving Law, has created a condition not contemplated when the original report and plans of the engineers for the Sewerage System were adopted. This Commission has given great consideration to the situation in the outlying districts of the City. Because of the widely scattered character of the proposed street improvement in the Annex, the construction of sewers in the proposed streets would result in many disconnected sections which cannot become a practical part of the Sewerage System until the general construction has reached these points, therefore the interest on unproductive or unused outlay would be a very considerable item for the taxpayers. Important as is the work in the Annex, it does not compare with the necessity and obligation to sewer the old portions of the City, especially that section included in the original general plan and outlined on the accompanying maps prepared by the Chief Engineer and adopted by this Commission in 1906. Upon these plans and estimates was based the cost of the Sewerage System. When they were considered and adopted, it was anticipated that at some time in the future the system would gradually and systematically be extended into the outlying districts, but the Commission is of the opinion that its duty under the Enabling Act is the establishing of a Sewerage System, and the sewering of the then built-up sections of the City first, leaving the extension of the system, which must go on year after year as development progresses in the northern and western limits of the City, to a permanent Department of the City Government, which shall assume charge of the system when the Commission's duties under the Enabling Acts are completed.

The cost of constructing sewers in newly designated streets in the undeveloped Annex, which were not located, or could not have been considered, at the time the Commission adopted the general plans of the system, should be provided for in exactly the same manner as any other future improvement, which development may require after the life of the Enabling Acts has run out, by the expenditure of the amount appropriated for construction as originally planned. There may be exceptional cases where wisdom and general economy require a modification of this policy; but more than this would result in the exhaustion of the Sewerage Fund before completion of the original scheme.

JONES FALLS CONDUITS.

On July 6 the contract for Section No. 1 of the Jones' Falls Conduit was let, and on November 1 the contract was awarded for Section No. 2. These two contracts embrace the entire work of covering Jones' Falls from a point two hundred feet south of Baltimore Street Bridge to a point just west of the Guilford Avenue Bridge, and was the practical beginning of the long contemplated improvement for the relief from conditions which have for years been steadily growing more serious until they became a menace to health, and a detriment to business.

The original plans considered by the Commission included the Jones' Falls improvement in the layout of the storm-water system, but it became evident upon a careful study of the general conditions that the first appropriation of $10,000,000 was not sufficient to admit of the Jones' Falls improvement without neglecting more pressing sanitary conditions. When the second loan was favorably acted upon by the voters, the reason for delay was removed, and working plans were promptly prepared for this work. On May 12 and 13, 1911, the Consulting Engineers, Messrs. Hering, Gray and Sterns, visited Baltimore and conferred with the Chief Engineer in regard to the Jones' Falls Conduits, and on May 26, 1911, reported to the Commission that the plans met with their approval, also commended the hydraulic features of the whole length of the conduits. On June 9 and 10, Messrs. Hering, Gray and Stearns again visited Baltimore for the purpose of inspecting Jones' Falls above North Avenue Bridge, also to examine the plans for a drift-catcher, and on July 27 reported to the Commission approving the plans, etc., of the Chief



BALTIMORE SEWERAGE COMMISSION

MAP SHOWING

JONES' FALLS IMPROVEMENT

FROM BALTIMORE ST. TO M^T. ROYAL AVE.,
AS RECOMMENDED IN CHIEF ENGINEER'S REPORT
TO SEWERAGE COMMISSION IN 1906,
WITH RELATIVE POSITIONS OF
DOCKS, MARKETS, PUBLIC BUILDINGS, AND FREIGHT DEPOTS.

Calvin W. Hendrick
Chief Engineer.

Engineer. The drift-catcher, or interceptor, will be constructed at a point south of the Cedar Avenue Bridge, most available from an engineering and practical standpoint, rights having been obtained, without cost, from the Northern Central Railway, which owns the property on the west side of the Falls, and from Mrs. Fannie A. Timanus, on the east side. The very full and interesting reports of the Consulting Engineers upon the Jones' Falls Conduits and drift-catcher are transmitted herewith, marked Appendix "A" and Appendix "B."

REPORT OF CHIEF ENGINEER.

There is transmitted herewith (Appendix "C") report of the Chief Engineer, which embodies the engineering features and other details of sewerage construction during the year. The average citizen, in his preoccupation with other matters, is hardly expected to always keep informed even upon this important work, or to appreciate that the construction of the Sewerage System is not merely the opening up of a trench and laying a pipe, but that every section, no matter how isolated, must bear a certain relation to every other section, as well as to the whole. Therefore, the report of the engineering features and general construction will prove interesting. In forwarding the report of the Chief Engineer, the Commission takes this opportunity to make reference to the skill and faithfulness which has characterized the work of the Chief Engineer, also the entire Engineering Staff and their loyalty to the City's interests.

OFFICE EMPLOYEES.

The rapid progress of the construction work during the year has greatly increased the labor and responsibilities of those employed in the Administrative Department, and they are entitled to great credit for their efficiency and willingness to meet every demand upon them.

Respectfully,

CHARLES ENGLAND, *Chairman,*
JAMES H. PRESTON, *Mayor,*
WILLIAM D. PLATT,
MORRIS WHITRIDGE,
IRA REMSEN,
J. EDWARD MOHLER,
WILLIAM W. MCINTIRE.

HARRY W. RODGERS, *Secretary.*

APPENDIX "A"

MAY, 22, 1911.

TO THE SEWERAGE COMMISSION OF THE CITY OF BALTIMORE,

MR. CHARLES ENGLAND, *Chairman,*
American Building, Baltimore, Md.

GENTLEMEN:

In accordance with your request, we met in Baltimore on May 12 and 13, 1911, and conferred with Mr. Calvin W. Hendrick, Chief Engineer, in regard to the plans then nearly completed for the Jones' Falls Conduits.

The portion of the open channel of Jones' Falls to be replaced by the conduits in the present improvement extends from a point just above the corner of Guilford and Mt. Royal Avenues and near the Union Station to a point 200 feet below Baltimore Street, but provision is made in the plans for a further extension to the harbor at Pratt Street, should such extension at any time be found desirable.

We considered the feasibility of the project, the quantity of water which might be brought to such conduits by the largest floods and the necessary features of the designs in order that the conduits should be able to convey efficiently and safely the water of such floods. We made a careful examination of the plans which had been prepared and inspected on the ground the route of the conduits.

We found that the project is a feasible one and that provision has been made for conveying 15,000 cubic feet of water per second, which, in our judgment, will not be exceeded during the largest floods. The quantity provided for is much larger than that actually flowing during any floods known to us, but we believe it to be the proper amount to provide for in the present case. In making this statement, we have, of course, given due consideration to the size of the drainage area. The general features of the designs have our approval, as they meet the requirements of the situation in regard to efficiency and economy in construction.

We have considered Mr. Hendrick's suggestion of the possible obstruction of these conduits by trees, bridges, small buildings or other things which might be washed away by a phenomenal flood, such as is provided for in this case, and while it seems probable that with conduits of such magnitude nearly all large objects would pass through without obstructing them, some large objects, if not intercepted elsewhere, might lodge on the dividing walls at the head of the triple conduit and cause an obstruction. We, therefore, approve the adoption of some plan which will provide at a suitable place above the head of the conduits means for intercepting large floating objects.

On May 19 we received from Mr. Hendrick three completed plans relating to the portion of the conduits known as Section 1, extending from a point 200 feet south of Baltimore Street up to a point 153 feet south of Centre Street, this being the portion to be included in the first contract for the work. These plans meet with our approval, but we desire to qualify this statement, so far as it relates to the strength of the structure and the bearing power of the piles under it, by stating that we have made no detailed computations relating to these matters, understanding that in regard to them you will depend upon the computations made by your engineering department.

On the same date we received a plan showing the hydraulic features for the whole length of the conduits, which also meets with our approval.

Respectfully presented,

(Signed) RUDOLPH HERING,
(Signed) SAMUEL M. GRAY,
(Signed) FREDERIC P. STEARNS,
Advisory Engineers.

APPENDIX "B"

New York, July 27, 1911.

To the Sewerage Commission of the City of Baltimore,

Mr. Charles England, *Chairman*,
American Building, Baltimore, Md.

Gentlemen:

In a report dated May 22, 1911, we advised you as to certain general features of the proposed Jones' Falls Conduit and approved two completed plans of the lower portion of the conduit known as Section 1. On June 9 and 10 we were in Baltimore for a further conference with Mr. Hendrick, examined the valley of Jones' Falls for a mile and a half above the head of the proposed tunnel, with reference to the proper location for a drift-catcher, and visited the Sewage Disposal Works at Back River.

On June 26, and on subsequent dates, we received from Mr. Hendrick plans of Section 2 of the conduit and of various locations and studies for the drift-catcher. On June 29, in Boston, and on July 3 and 27, in New York, we met again to compare our studies and confer regarding the plans.

There are three general plans of Section 2, extending from a point 153 feet south of Centre Street, northerly to the tunnel, and consequently embracing all that portion of the conduit north of the point to which the plans of Section 1 were approved in our last report. There is also one plan showing preliminary details of the Junction Chamber, and another showing study of entrance channel to tunnel.

On the plan of the most southerly portion of Section 2, we note that 30-inch pipes are provided at several streets to carry the flow of storm-water drains under the two westerly conduits to the easterly conduit. These are not shown in sufficient detail to enable us to pass upon this portion of the plan, but the combined capacity of these pipes seems to be too large at some of the crossings and there also seems to be a departure from the policy pursued at the Chase Street siphon, built a few years ago, and which we prefer, where small and large pipes are provided—the smaller flows being carried through a small pipe until its capacity is exceeded, when the water rises and passes through the larger pipes.

In considering the cross-sections shown on this plan, we believe it advisable, where the structure is to be supported upon the rock, to build an additional longitudinal wall one foot thick under the middle of each of the larger conduits, so that the support of the invert will be independent of the earth under it. This precaution will add little to the cost. A similar wall should be provided where similar conditions exist on Section 1. Except as noted, we approve this plan.

On the next plan, and on a portion of the third plan, covering the middle portion of Section 2, we note that changes have been made in the elevations of the bottom of the east conduit from those on a profile previously approved. These changes have been made in part to facilitate the carrying of drains under the westerly conduits to the easterly conduit, and in part to improve the conditions of flow from the Junction Chamber into the easterly conduit. These changes and the plan meet with our approval.

On the third plan, embracing the extreme upper end of the triple conduit, the Junction Chamber and the tunnel with its approach, we note the lining of the sides and arch of the tunnel consists of 12 inches minimum thickness of masonry. We approve of this minimum thickness, provided the masonry lining between the invert and a point at least 23 feet above it is built solidly to the rock.

The general features of the Junction Chamber, shown in preliminary detail on a separate plan, meet with our approval.

The approach to the tunnel, also shown in detail on a separate plan, indicating a gradual change in the cross-section of the open channel to that of the tunnel, and a gradual descent of the invert from the bed of the stream to the invert of the tunnel, also meet with our approval as to the general features.

We desire to qualify our approvals by stating that we have not made sufficient detailed computations of the strength of the reinforced concrete structures or of the trusses which support the roof of the junction chamber, understanding that in regard to these matters you will depend upon the computations made by your engineering department.

Regarding the proposed drift-catcher across Jones' Falls, we have the following comments to make:

The enclosure of Jones' Falls and its artificial diversion through a tunnel and thence through a triple conduit headed by two cut-waters makes it desirable to erect above the tunnel entrance means for catching large drift, such as trees, bridges, small buildings, etc., which might block a part of the new channel.

The natural and usual plan in such a case is to put a drift-catcher as closely as practicable to the point where an obstruction may occur.

After an examination of the valley for one and a half miles above the tunnel, we found that not until the upper portion of this distance was reached, and a short distance below the Rock Mill, would a flood of 15,000 cubic feet per second, for which provision has been made in the proposed structures below, be retained within the present banks of the stream, without overflowing the Falls Road, the railroads and other low-lying property.

A flood which occurred in 1905, we are informed, discharged about 9,500 cubic feet per second, and between the crossing of the Pennsylvania Railroad and the mouth of Stony

Run, flooded, to a few feet in depth, nearly all of the Falls Road, the Baltimore and Lehigh Railroad and some adjoining property.

In the future, it will be desirable, in accordance with the usual practice, to regulate the channel of Jones' Falls above the tunnel first by deepening it and then either covering or walling it up on both sides, so that a cross-section is provided sufficient to carry the greatest freshet waters without flooding any adjacent territory.

Some 7,000 feet above the tunnel is the mouth of Stony Run, which has a length of about 4 miles and, at present, has several bridges crossing it, a railroad following up the valley and a number of buildings located near the stream.

Two alternative treatments are available. One is the placing of a drift-catcher across the valley at some point below the mouth of Stony Run and above Maryland Avenue, which latter is about 1,800 feet above the tunnel. The other is above the mouth of Stony Run and about 7,500 feet above the tunnel.

Any location south of the crossing of the Baltimore and Ohio Railroad should, in our opinion, not be adopted, because of the increased danger of turning flood waters down the railroad into the Union Station. Therefore, the lowest practicable location would be to the north of the Baltimore and Ohio crossing, or about 3,800 feet above the tunnel.

Between this point and Stony Run, and in order to be effective during the largest floods, a drift-catcher would have to extend across the flooded area, including both the railroad and the Falls Road. Or, as an alternative, the railroad and the Falls Road would have to be raised above the flood height, confining the drift-catcher practically to the present channel. This raising of the roads would be expensive.

On the other hand, at a point about 300 feet below the Rock Mill, a drift-catcher can be built across the entire channel without interfering with any public road, and another, but smaller one, across the Stony Run Valley, unless bridges will take its place. By this means the tunnel can be protected from drift carried by a freshet of 15,000 cubic feet per second. The position of these two drift-catchers would leave a slightly larger open area furnishing drift material between them and the tunnel than in the case of a single structure below the mouth of Stony Run.

For the reasons given, however, we do not find a decided preference for either location, and believe that the latter will require less expenditure and, therefore, recommend its adoption.

It will be necessary, however, to exercise some control over the flood channel between the tunnel and the drift-catcher. First, by keeping the trees, growing along the banks of the stream well cut down, and, secondly, so far as practicable, by preventing undesirable structures from being erected and bulky floatable materials from being stored within the flood channel.

The drift-catcher which we approve for immediate construction is located, as already indicated, at a point about 300 feet below the Rock Mill, where there is ledge rock on both sides and, as we understand, also in the bottom of the valley.

The arch and pier type of structure, which we approve, is shown in part upon the preliminary plan furnished by Mr. Hendrick, entitled "Studies for Drift-Catcher," and in part upon a plan, dated July 12, 1911, giving alternate designs of the drift-catcher.

The general design consists of narrow piers about 20 feet high, spaced 8 feet apart from centre to centre, held at the bottom by being concreted into pits excavated in the rock, and at the top by a horizontal concrete arch extending from one side of the valley to the other and abutting against the ledge.

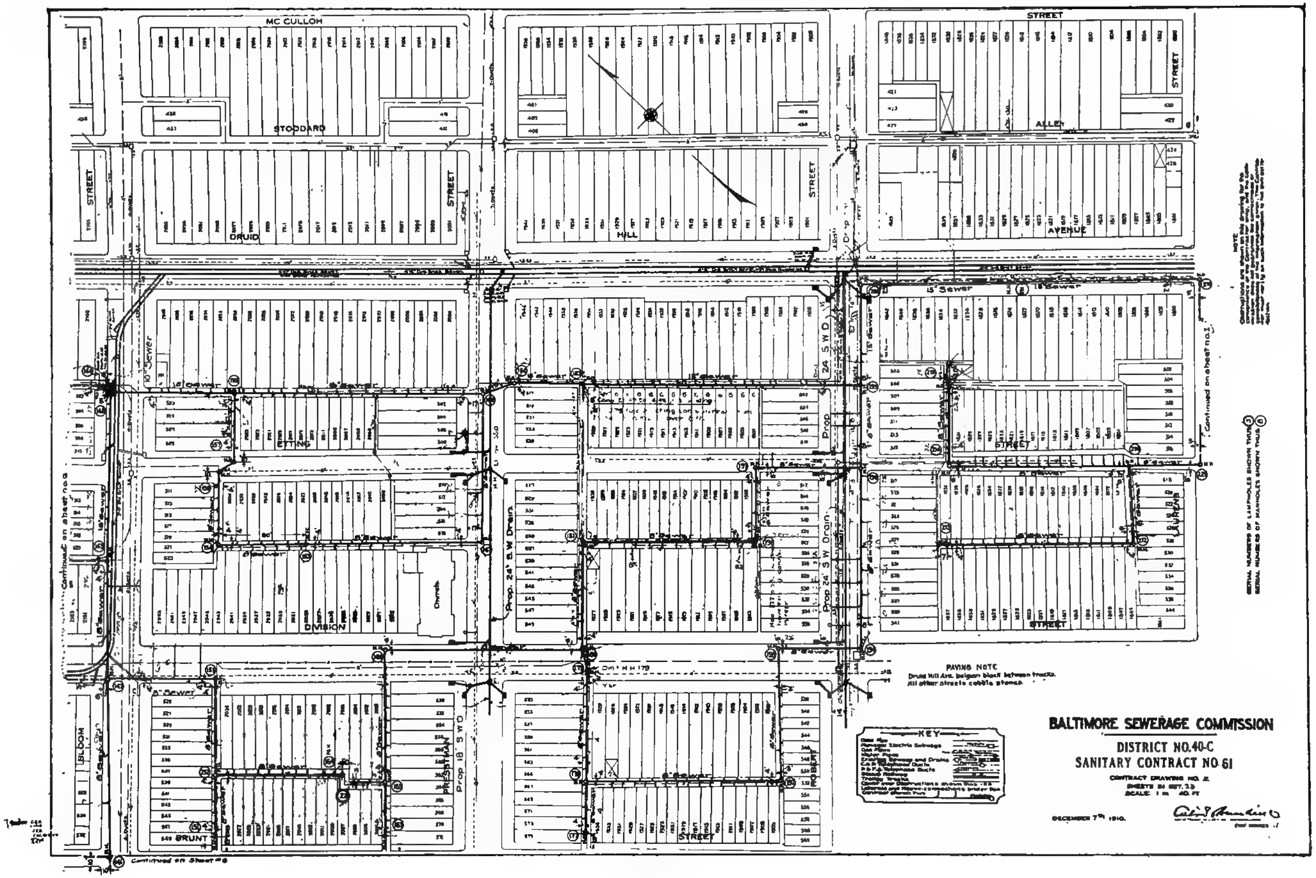
Either design of pier shown on the plan of July 12 would be satisfactory. The one to be selected will depend upon the local conditions, especially on the depth to the rock. Should the depth be greater than indicated upon your plan, it may not be advisable to reach the rock, but to build instead, in a trench excavated in the bed of the stream, a bottom arch corresponding in its general design to the upper arch now shown on the plan.

We have been asked to consider and advise as to the extension of the Sewage Disposal Works so that they will be capable of providing for a larger population than can be taken care of by the portion of the works already built.

We have given this matter due consideration and believe that the practical operation of the portion of the works already built, for six months or a year, will furnish much additional information of value in designing the extension of the works, and that they should not be extended until that experience has been obtained, provided it is possible so to adjust the rate of building the lateral sewers and connecting the buildings as not to seriously overtax the portion of the Disposal Works now constructed.

Respectfully presented,

(Signed) RUDOLPH HERING,
(Signed) SAMUEL M. GRAY,
(Signed) FREDERIC P. STEARNS,
Advisory Engineers.


BALTIMORE SEWERAGE COMMISSION
DISTRICT NO.40-C
SANITARY CONTRACT NO 61
CONTRACT DRAWING NO. 2
DECEMBER 7TH 1910.
KEY
PAVING NOTE
Druid Hill Ave. belgian block between tracks.
All other streets cobble stones.
NOTE
SERIAL NUMBERS OF LAMPHOLES SHOWN THUS
SERIAL NUMBERS OF MANHOLES SHOWN THUS
MC CULLOH
STREET
STODDARD
DRUID
HILL
AVENUE
ALLEY
DIVISION
ETTING
STREET
LAURENS
ROBERT
PRESSTMAN
BLOOM
BRUNT
Church
15" Sewer
18" Sewer
10" Sewer
8" Sewer
24 S W D
Prop. 24" S.W. Drain
Prop 18" S W D
Continued on sheet no.2
Continued on sheet no.9
Continued on Sheet no.6

APPENDIX "C"

ANNUAL REPORT

OF THE

CHIEF ENGINEER

FOR THE YEAR 1911

December 30, 1911.

Mr. Charles England, *Chairman, and*
Gentlemen of the Sewerage Commission.

Dear Sirs:

The results of our construction work during 1911 will make the year stand out as one of the most important milestones in the history of the City. Some of the results accomplished have been:

1. The connecting of the first dwelling to the Sanitary Sewerage System, thereby putting into actual operation the great Sewerage Disposal Plant at Back River, with units completed to purify the sewage from about 300,000 people;

2. The completing of the Sewage Pumping Station, together with foundations for five 27,500,000 gallon pumps;

3. The practical completion of the installation of three of the 27,500,000 gallon pumps, together with engines, boilers, etc.;

4. The relieving of flooded conditions in various parts of the City by the installation of storm-water drains;

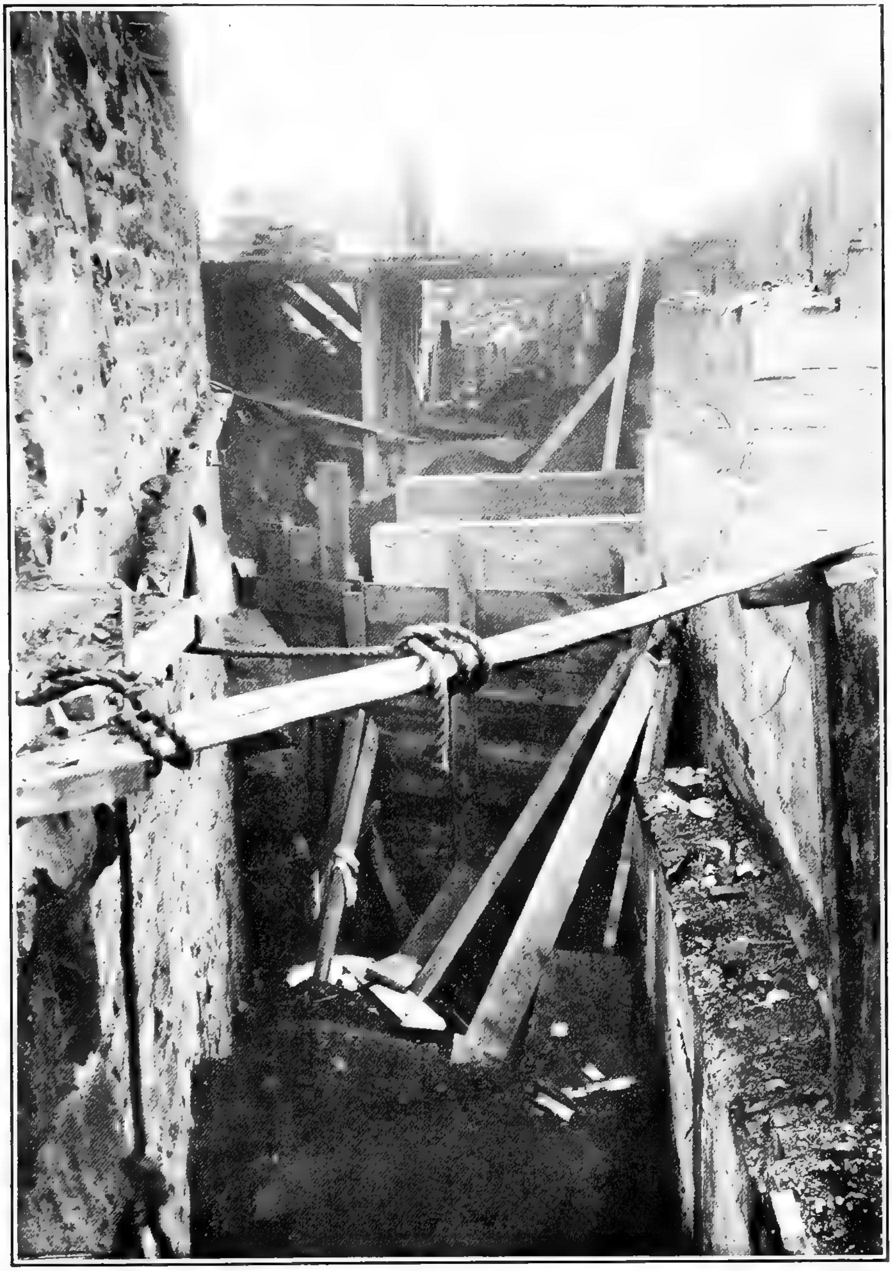
5. Placing under contract the reinforced concrete conduits that will enclose Jones' Falls from a point about 200 feet south of Baltimore Street nearly to Union Station, as outlined in my 1906 Report.

Total amount expended and placed under contract in 1911,	$2,653,810 78
Grand total expended and contracted for to date.........	10,515,032 82
Total number of miles of sewers and drains laid and contracted for to date, approximately....................	215
Appropriation asked for 1912..........................	$4,596,881 00

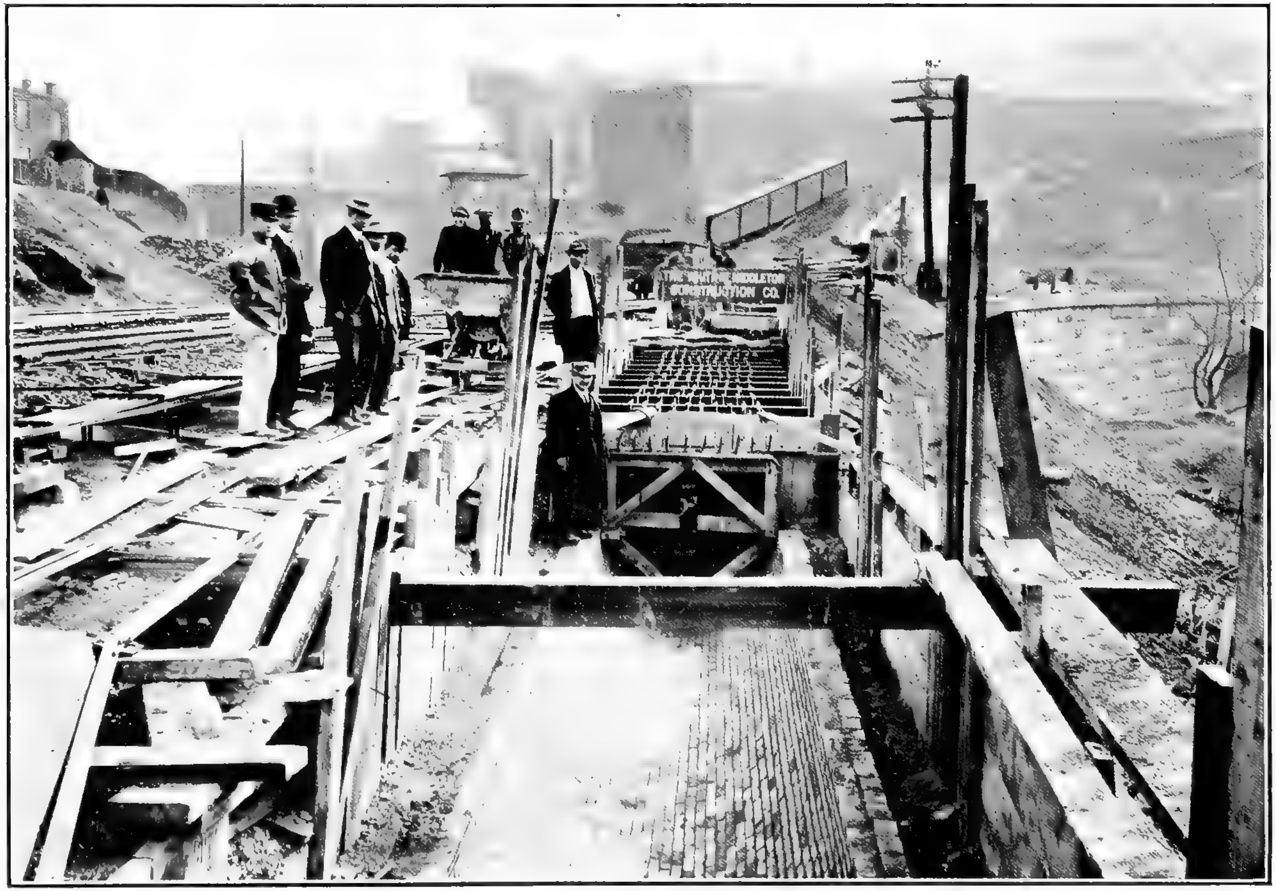
SANITARY.

The question is naturally asked, why we did not let the entire Disposal Plant at one letting. This was not done for the reason that, when the present Sewerage Commission came into existence they found a loan of $10,000,000 available. Our estimates of 1907 showed that to sewer and drain the City, in accordance with the Enabling Act, would require twice that amount. Not being certain that sufficient money would be forthcoming later on, to sewer and drain the entire City, we decided to expend the money in such a way as to build a sufficient number of units at the Disposal Plant, and enough sanitary sewers throughout the City, to take care of practically half the population, so that, in case the work had to stop, we would leave a complete, workable plant as far as the $10,000,000 would go, thereby preventing the expenditure of money for construction work that would lie idle in the ground until the entire system could be completed.

During the year many difficult problems had to be overcome in planning and constructing the sewers throughout the City, two of the most notable being the carrying of the large High Level Interceptor (which carries two-thirds of the City's sewage) across Jones' Falls at Eager Street, which will be done



JONES' FALLS SANITARY INTERCEPTOR, SECTION No. 2.
Looking East from Guilford Avenue, Showing Piers Under Flattened Section in Filled Ground.



JONES' FALLS SANITARY INTERCEPTOR, SECTION No. 2.
Looking East from Guilford Avenue, Showing I-Beams and Reinforcing Rods on Flattened Section.

by means of an inverted siphon; and the construction of this same sewer in the vicinity of Washington's Monument. The best route for the sewer was down St. Paul Street to Monument Street, across Monument Place, passing between the Monument and the Peabody Institute, thence to Centre Street, and west on Centre Street. Being unable to get any information regarding the size, depth or construction of the foundations of the Monument, I hesitated, without this information, to construct such a large sewer in close proximity to the Monument. I therefore decided to construct the sewer in St. Paul Street to Madison Street, thence to Cathedral Street, and in Cathedral Street to Centre Street, etc. In order to interfere as little as possible with travel, we are constructing this sewer in tunnel, with shafts, securing satisfactory results.

I attach hereto a map (Plate No. 2) showing the areas that have been sewered, or in which sewers are now under contract, which shows that practically all of East and Northeast Baltimore is sewered, or under construction; also large areas in the middle section south of Druid Hill Park, this latter area being at the source of the McMechen Street Interceptor. The reason for beginning our work in these sections of the City is because they are drained by gravity through the High Level Interceptor. Large areas in the low level district, around the harbor, are also ready and will shortly be connected to the intercepting sewers leading to the Pumping Station. From now on we will push the construction of sewers in the business section of the City.

A bird's-eye view of the general layout of our sanitary sewers, in connection with the Outfall Sewer and Disposal Plant, reminds one of a tree—the Disposal Plant being the roots, the Outfall Sewer the trunk, the large intercepting sewers throughout the City the branches, small laterals the twigs, the houses the leaves, and the people the birds in the trees.

SEWAGE PUMPING STATION.

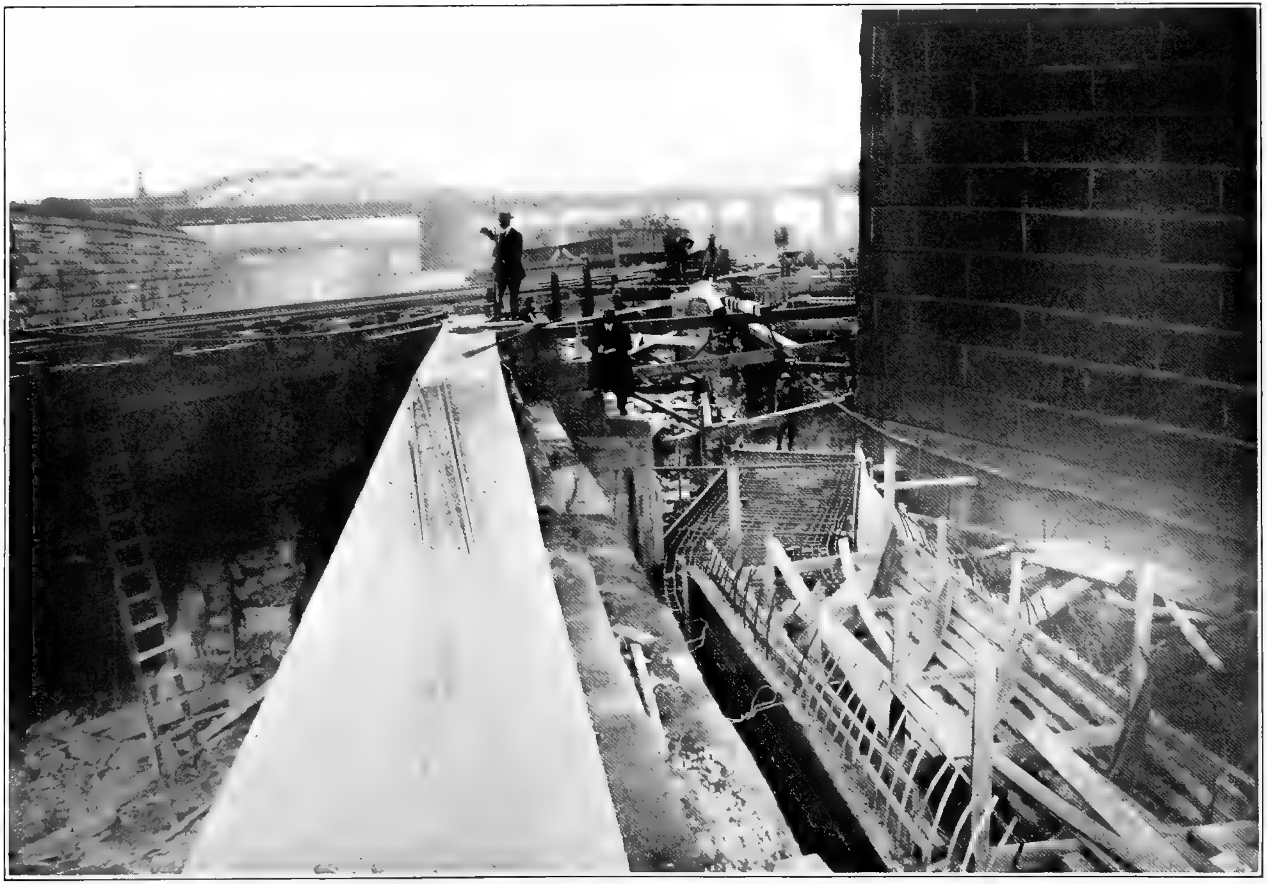
The long and vexatious controversy with the Building Inspector regarding the foundations of the Pumping Station having been decided in our favor (thereby saving the City approximately $100,000), the work has progressed rapidly. The building is completed, and the installation of three of the 27,500,000 gallon pumps will be completed and the pumps will be ready for operation within a few weeks.

The location and design of this station have been worked out after careful consideration to secure both rail and water transportation for coal, which is handled automatically from either barges or railroad cars. The building is of brick and stone on a concrete foundation. The walls are of granite below the main floor, above which they are of light brown brick, with terra cotta moldings and copper cornice. The roof is of slate, supported by steel trusses which are carried by steel columns built into the walls. These columns also support the traveling crane.

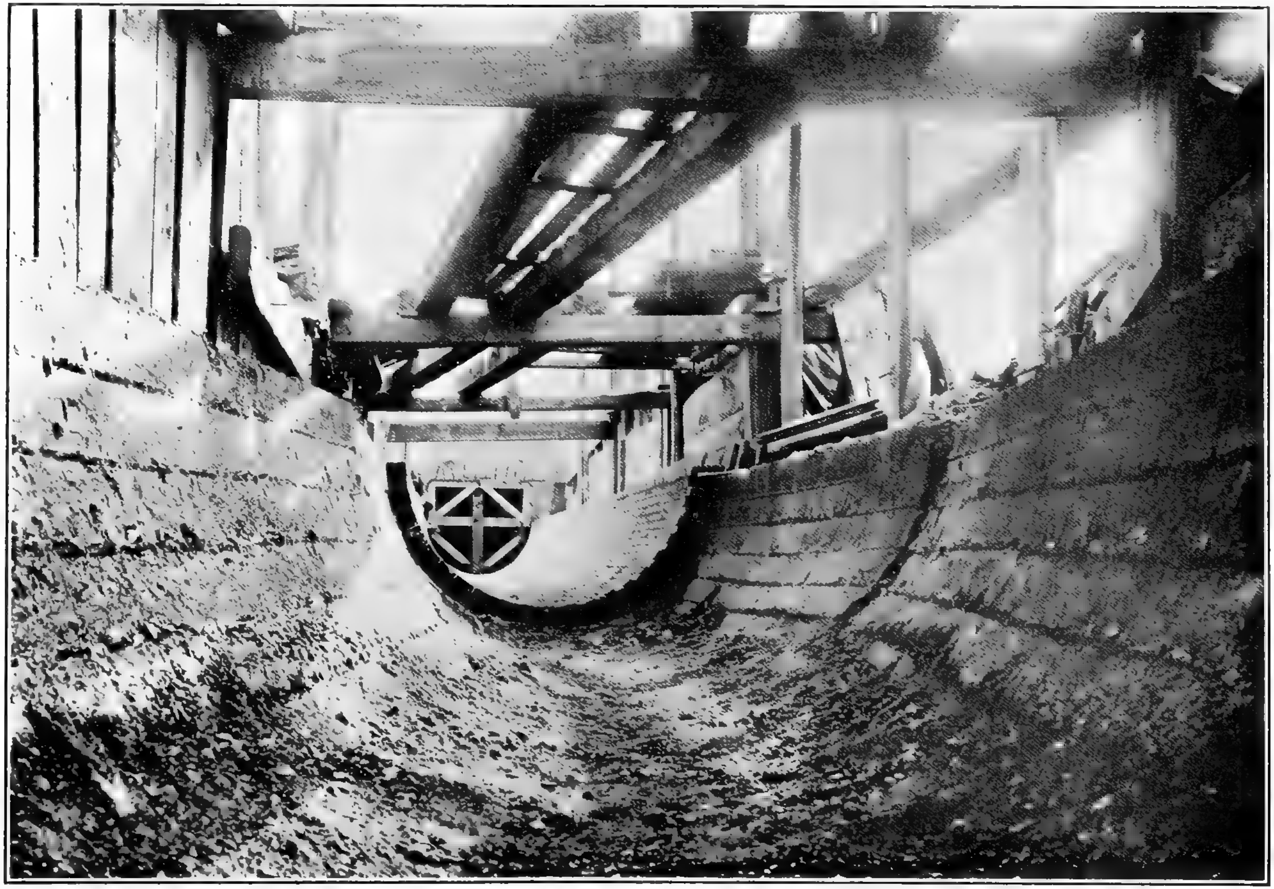
The building is fireproof throughout. Its outside dimensions are 188 feet by 156 feet 7 inches. The height from the ground to the top of the walls is about 59 feet, and to the top of the tower for the coal and ash handling machinery about 110 feet. On account of the character of the ground at the site of the building and the great weight of the machinery, the foundations were carried to a depth of from 23 to 35 feet below mean low tide, at which depth an excellent foundation was reached.

In addition to the engine and boiler rooms and the screen chamber, the building contains a reception room, offices for the superintendent of the station and for general purposes, a drafting room, storerooms and bath and toilet rooms.

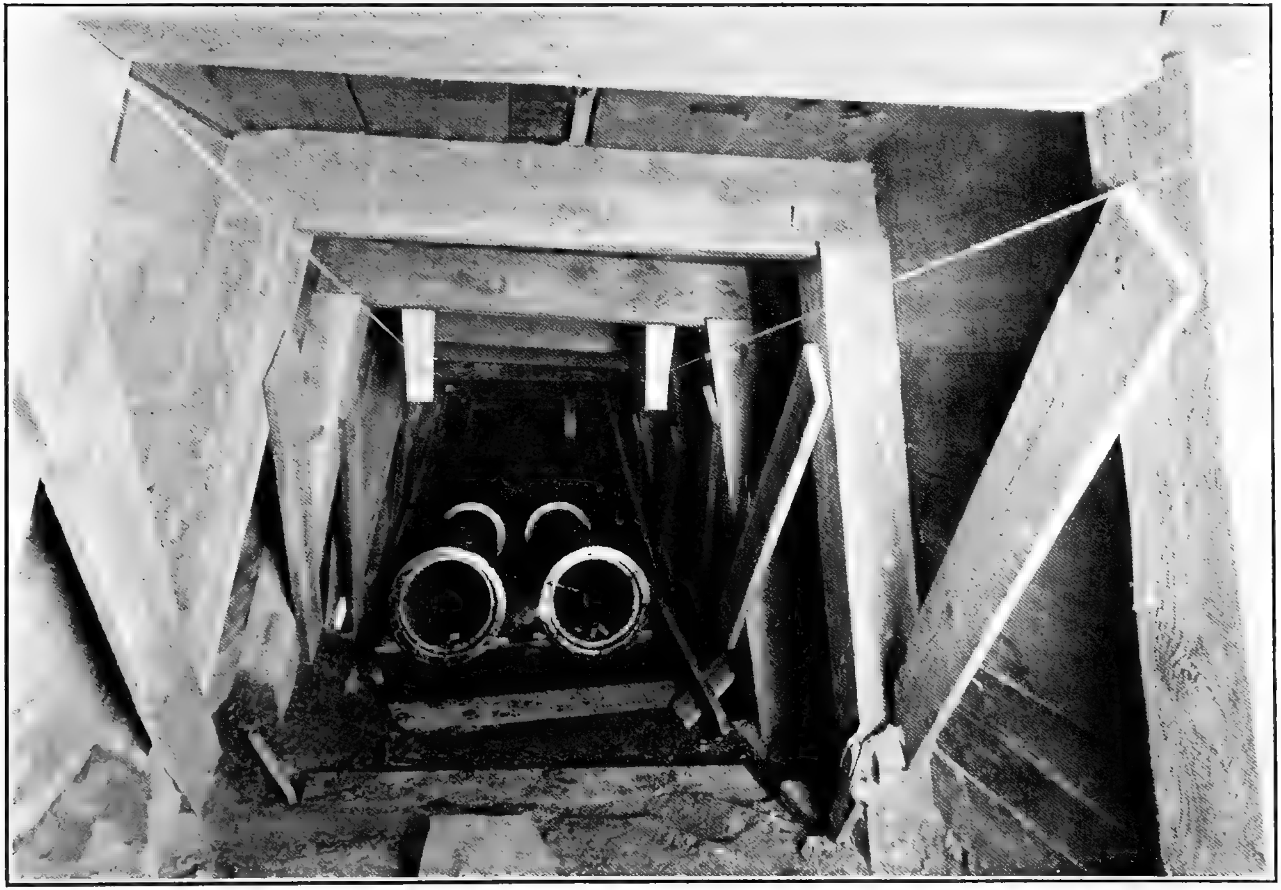
The engine room is 180 feet long, 54 feet wide and 68 feet high from the basement floor to the tie beams of the trusses. It is lined with enameled brick to a height of 23 feet above



JONES' FALLS SANITARY INTERCEPTOR, SECTION No. 2.
Showing Location of Interceptor near Union Station, Between New Retaining Wall and Pier of Guilford Avenue Bridge.



JONES' FALLS SANITARY INTERCEPTOR, SECTION No. 2.
Showing Concrete Cradle, Brick Invert and End of Completed Portion of Flattened Section East of Guilford Avenue.



McMECHEN STREET SANITARY INTERCEPTOR.

Tunnel Under B. & O. R. R., South of North Avenue, Showing Double Line of 16-inch Cast-iron Pipes and Method of Timbering.

the basement floor; above that level the walls are of cream-colored, impervious brick. This room will contain five (5) sewage pumping engines, two (2) drainage pumps, a 20-ton electric crane, the electric generators and switchboard, and valves and piping to control the discharge from the pumps. Of the five (5) pumping engines, three have been installed—the other two will be added as the volume of sewage increases. They are vertical, triple-expansion, crank-and-fly-wheel, condensing engines, each having three steam cylinders 22, 41 and 62 inches in diameter, all of 60 inches stroke. The designed speed is 20 revolutions per minute, and at this speed each engine will pump 27,500,000 gallons of sewage every 24 hours against a head of 72 feet, or a total of 82,500,000 gallons every 24 hours for the three pumps at present installed. Each engine will develop about 400 horse power at normal speed.

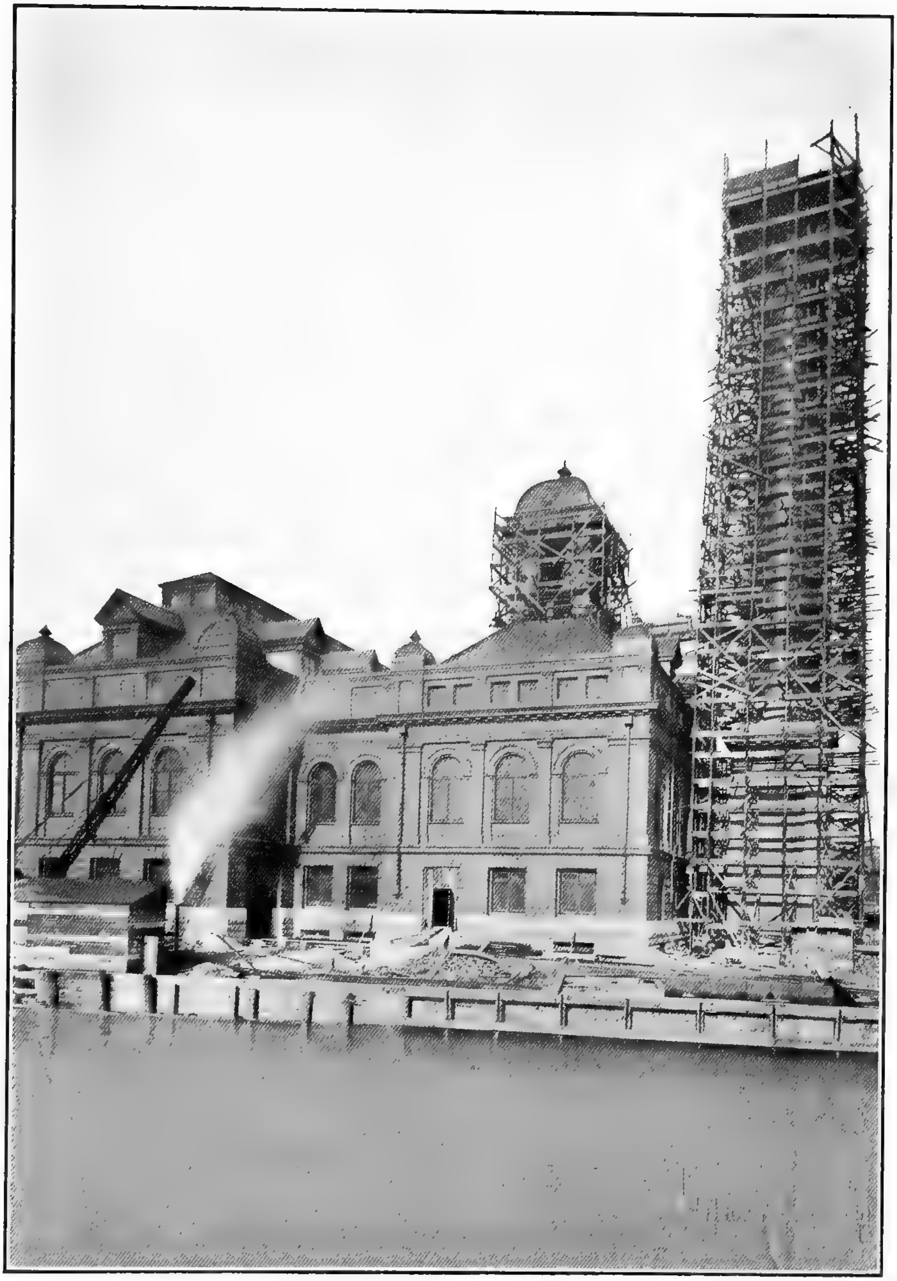
The sewage will be discharged through cast-iron force-mains into a large sewer which connects with the Outfall Sewer at Chase and Durham Streets, from which point it flows by gravity to the Disposal Plant. Each force-main is 42 inches in diameter, and the piping is so arranged that each pumping engine can discharge into either of the two force-mains. It is intended that one of the engines shall be always held in reserve to allow for possible breakdowns. It is expected that when the population of the City has reached 1,000,000, the average flow of sewage in the Low Level Interceptors will be equal to the capacity of two of the pumping engines, and that four of them will be able to take care of the maximum flow that will occur at any time.

The drainage pumps are 12-inch centrifugal pumps, driven by compound, condensing engines of about 40 horse power each, and have a capacity of 3,000 gallons per minute each. These pumps will draw water from the underdrains which have been laid under the interceptors, and will discharge it either through the condensers of the sewage pumping engines or directly to the harbor, as may be desired.

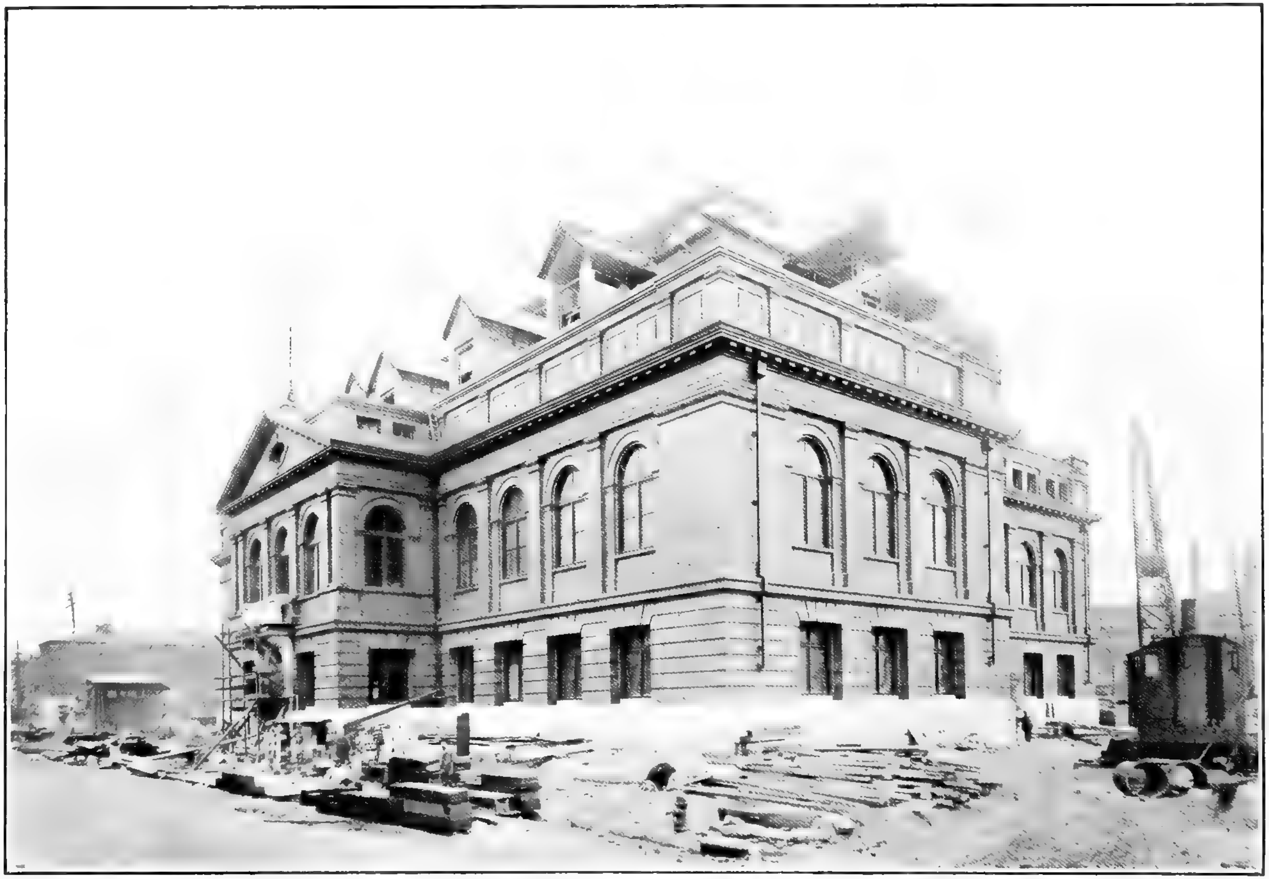
Between the engine room and the boiler room is the screen chamber. Here, below the level of the main floor, is the reservoir into which the sewage is discharged from the interceptors, and from which it is drawn by the pumps.. Before passing to the pumps the sewage will be screened twice—first through a set of movable screens at the entrance to the screen chamber and then through fixed screens located over the suction pipes of the pumps. The movable screens will be arranged to take out the coarser materials, and will be hoisted out of the sewage when it is necessary to clean them. Any material collecting on the fixed screens will be raked off by hand. The water in the material taken from the screens will be pressed out by steam or hydraulic pressure, and the screenings will then be burned in a furnace located in the boiler room basement. Above the screen chamber, on a level with the main floor of the building, are located toilet rooms for the engine room and boiler room forces, an up-to-date machine shop of sufficient capacity to take care of ordinary repairs, and a storeroom, and above these is a gallery giving access to the main steam pipes.

The boiler room is 94 feet long by about 50 feet wide, and space is provided for five water-tube boilers, (set separately), two economizers, coal and ash handling machinery, auxiliary pumps, etc. Above the boilers are coal bins with a capacity of 1,200 tons. This amount is sufficient to run the station at its full designed capacity for nearly three months. Three boilers, one economizer and the coal and ash handling machinery have been installed. In the basement of the boiler room are located the incinerating furnace for the screenings, a toilet room for the screenmen, and storerooms for repair parts required in the boiler room.

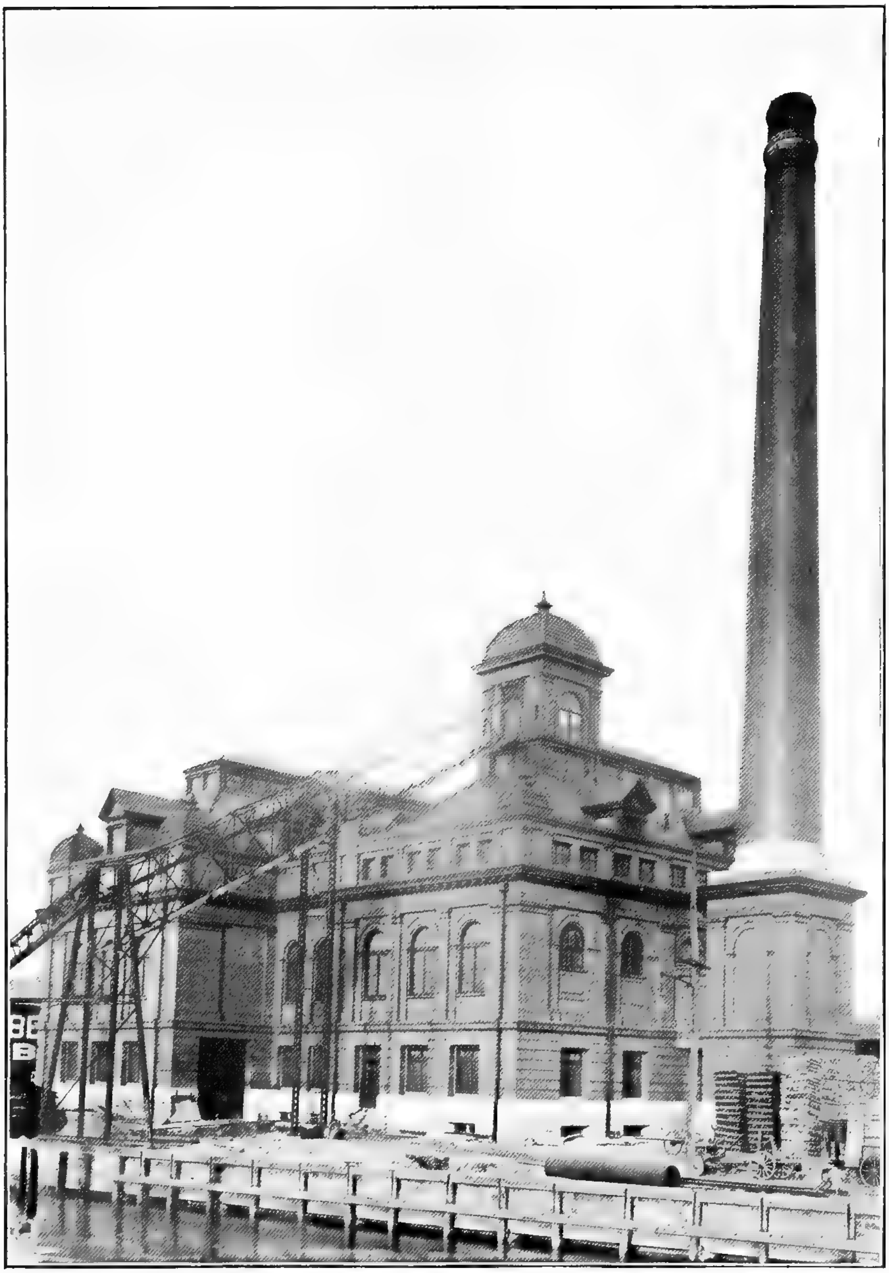
The boilers are water-tube boilers of the Babcock & Wilcox type, each of 265 boiler horse power. Of the three boilers installed, one only will ordinarily be under steam, and when the station is operated at its full capacity it is expected that



SEWAGE PUMPING STATION.
Looking Northeast, Showing Chimney Under Construction.



SEWAGE PUMPING STATION.
Looking Southeast, Showing Building Practically Completed, With the Exception of the Roof and Interior Finish.



SEWAGE PUMPING STATION.
The Completed Building, Looking Northeast.

two boilers will ordinarily be in use—the others being put in service as required to take care of the fluctuations in the flow of the sewage. Each boiler is of sufficient capacity to run one main engine and all auxiliary machinery, and has a heating surface of 2,650 square feet and a grate area of about 60 square feet. The steam pressure is 165 pounds.

Each economizer has 1,400 square feet of heating surface and will heat the feed water from about 90 degrees to about 200 degrees Fahrenheit.

The steam piping between the boilers and the engines is so arranged that no single accident can put more than one boiler or one engine out of service. The boilers are connected to a single chimney, which is 200 feet high above the boiler room floor, and 6 feet 8 inches in diameter at the top. The chimney is built of brick of the same color as the outside walls of the building, and is lined with fire-brick for half its height. It is built on a concrete foundation, carried to the same depth as the foundations for the building. The foundations for the pumps are separate from those for the building, in order to absorb any slight vibration that might come from the engines, although the latter are so constructed that there will be practically no vibration.

STORM-WATER DRAINS.

On beginning actual construction, the Commission felt that the sanitary side of the question should be pushed to the exclusion of the storm-water drains, with the exception of about $1,000,000 to relieve certain sections of the City that had been suffering for years from flooding, with heavy law-suits threatened, especially around Harrison and Saratoga Streets.

This policy prevented the carrying out of the storm-water construction as systematically as was done with the sanitary sewers. While we have practically all of the sanitary sewers laid or under contract in East and Northeast Baltimore, we still have some small stretches of storm-water drains to construct. The balance of the loan to complete the sewer work having been passed, we are now pressing the storm-water drain construction in such a way as to work in conjunction with the Paving Commission, so they can proceed with their work.

I attach hereto a map (Plate 3) showing the storm-water drains that have been constructed and put under contract, including old drains and those yet to be constructed.

On August 25, 1911, occurred one of the heaviest rainfalls in the history of Baltimore, as shown by the Weather Bureau records, causing serious overflows and resulting in my making the following special report to the Commission regarding the necessary relief, with the recommendation that appropriations to cover the work be included in our estimates for 1912, viz.:

DRAINAGE CONDITIONS IN VARIOUS SECTIONS OF THE CITY.

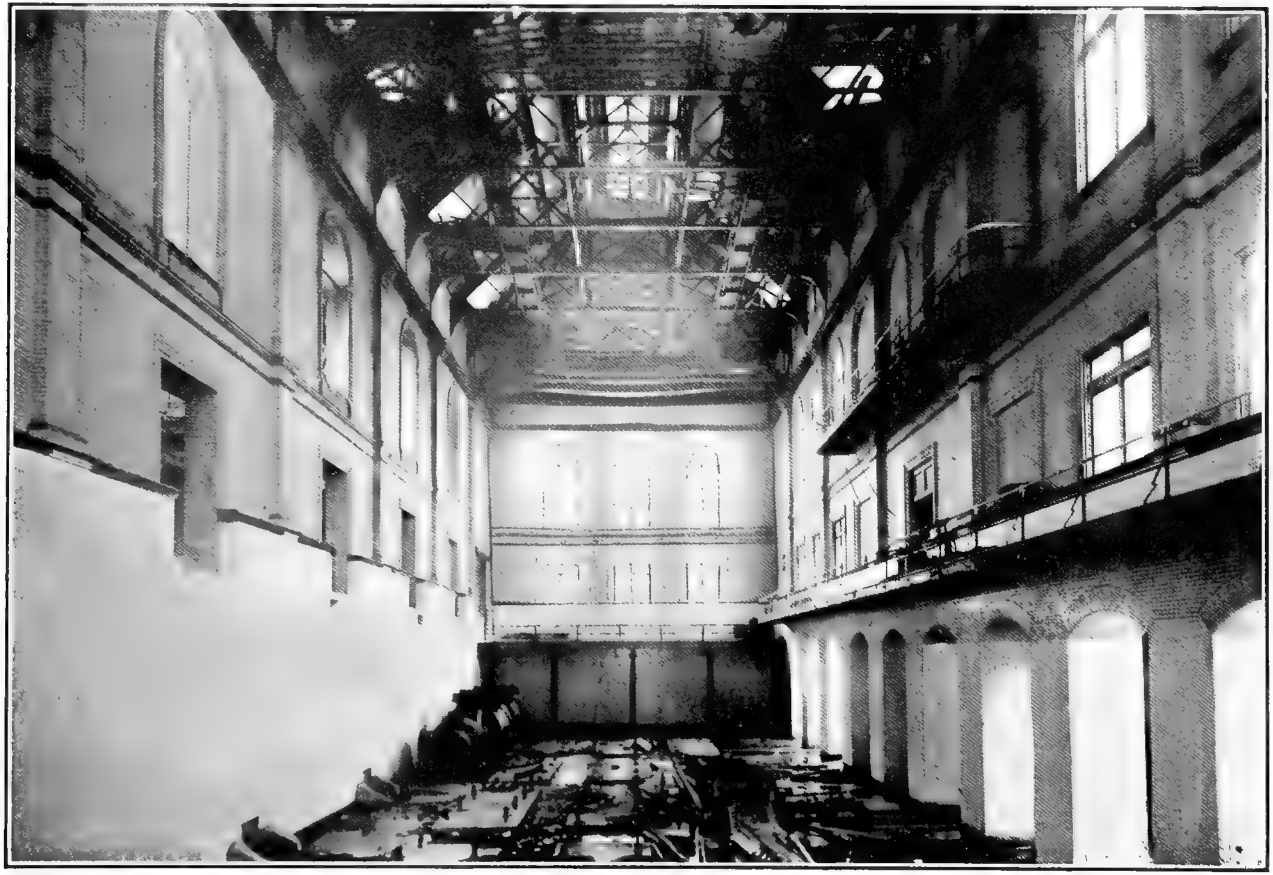
BALTIMORE, October 19, 1911.

MR. CHARLES ENGLAND, *Chairman, and*
GENTLEMEN OF THE SEWERAGE COMMISSION.

DEAR SIRS:

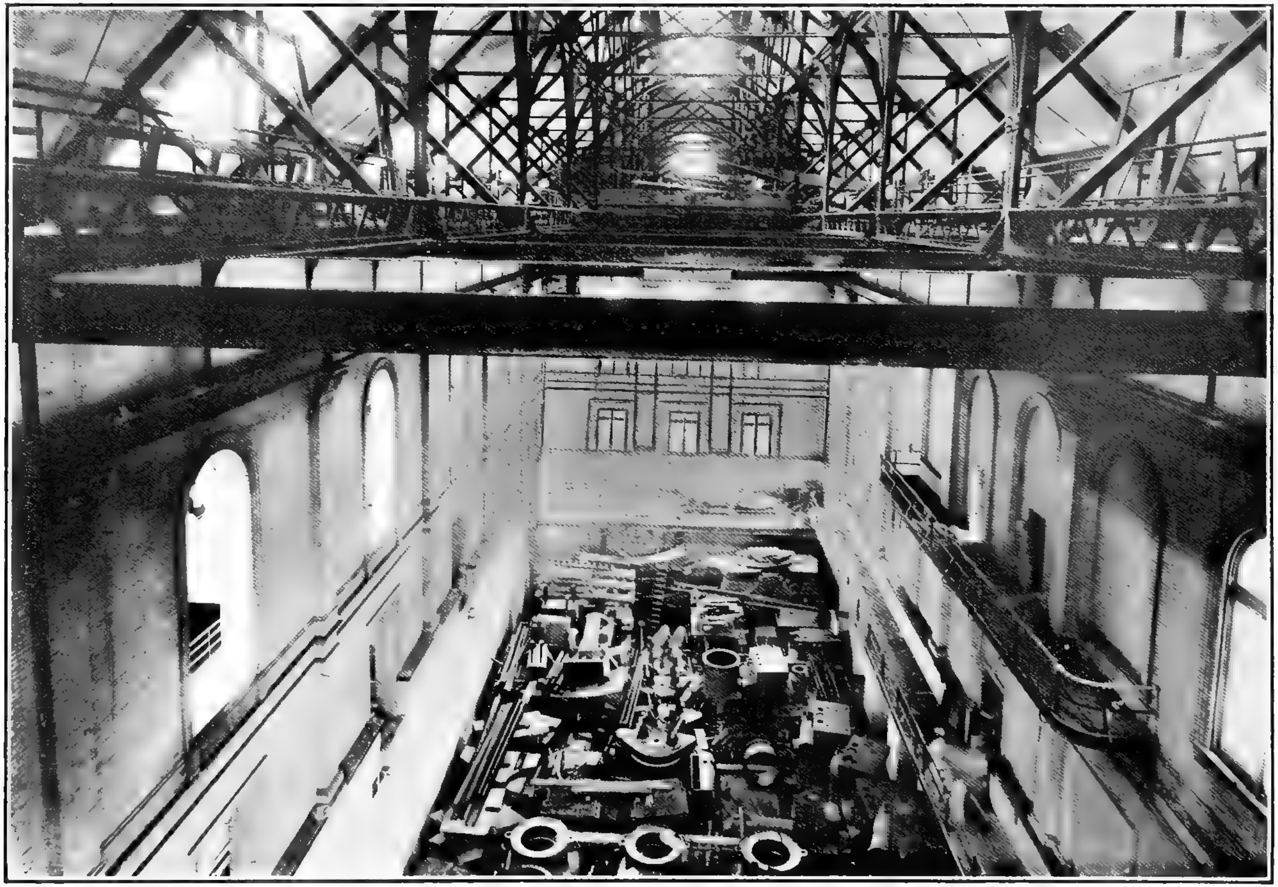
I return herewith the correspondence received with your letter of August 30, regarding drainage conditions at the following locations, particularly with reference to the damage due to flooding caused by the storm of August 25, 1911, viz.:

1. Roland Avenue, south of Twenty-sixth Street.
2. Leadenhall and Stockholm, and Leadenhall and Ostend Streets.
3. North Avenue, east of Slingluff Avenue.
4. Fairmount and Kenwood Avenues.
5. 900 block North Bond Street.
6. 2000 block Aliceanna Street.
7. 2300 block Boston Street.
8. Patuxent and Baltimore Streets.



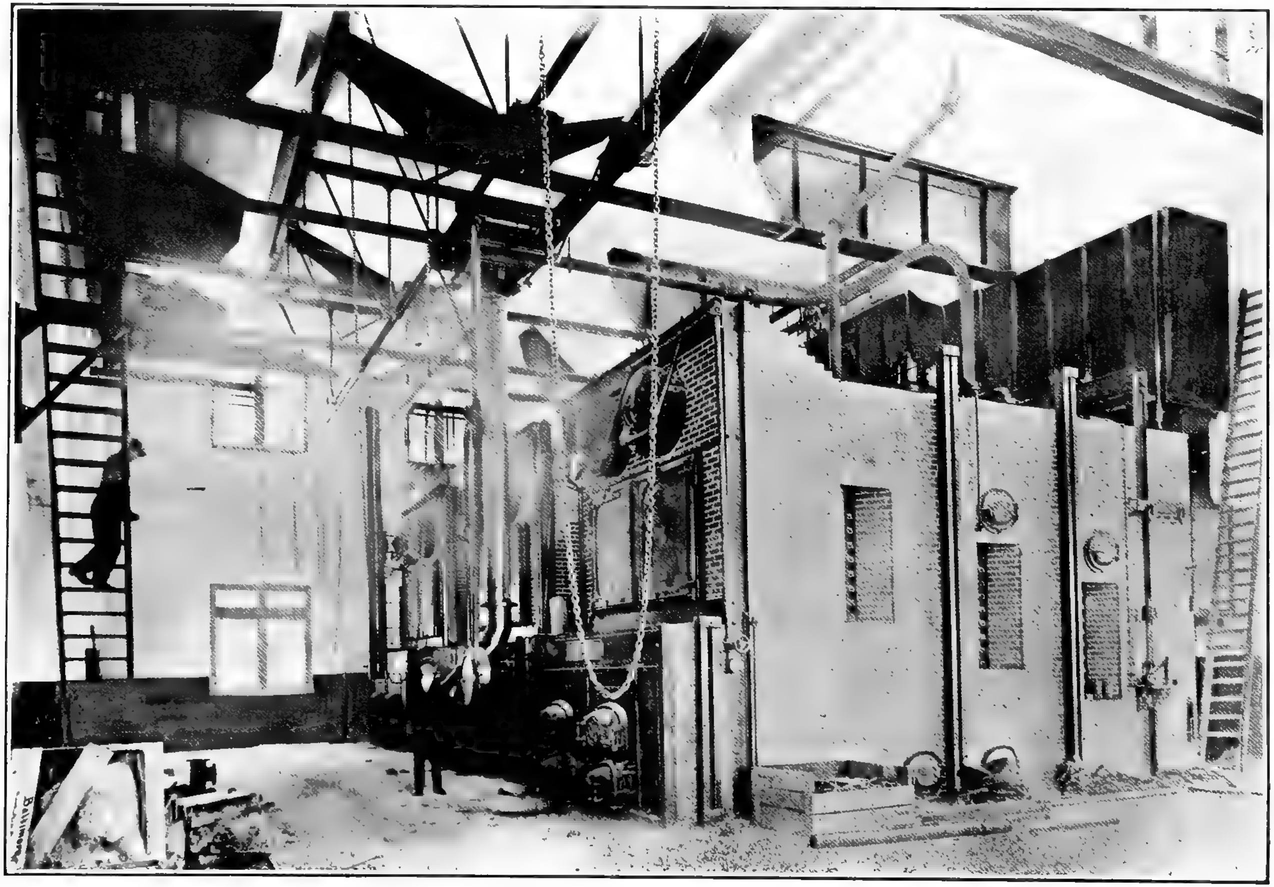
SEWAGE PUMPING STATION.

Looking West in Engine Room, Showing Building Practically Completed and Ready for the Reception of Machinery. The First Castings for the Pumping Engines (Shown on the Left) Were Unloaded by the Traveling Crane from Cars Placed Inside the Building, on the Platform at the End of the Engine Room.

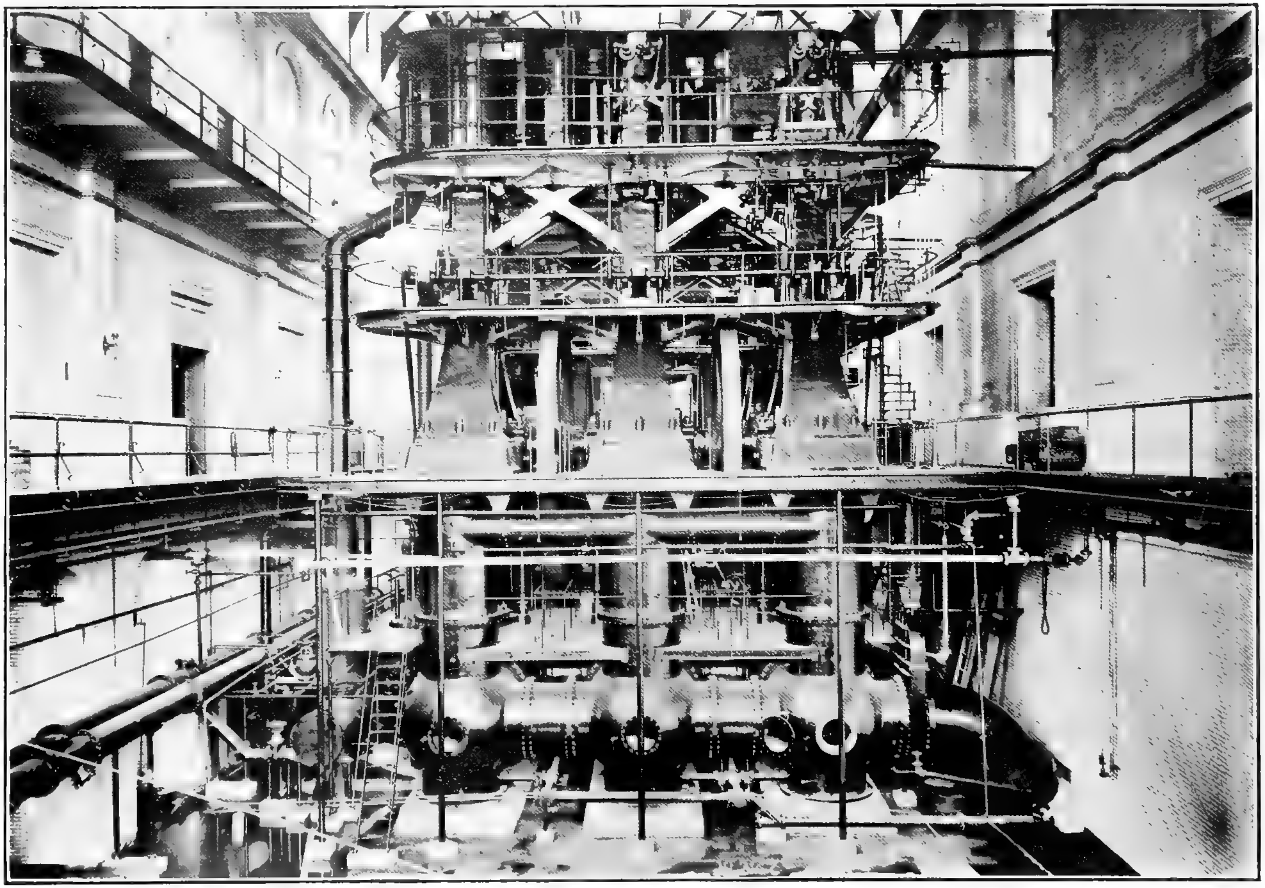


SEWAGE PUMPING STATION.

Interior of Engine Room, Taken from Foot-way in Roof Trusses at Easterly End of Building, Showing Parts of the Pumping Engines.



SEWAGE PUMPING STATION.
Interior of Boiler Room.



SEWAGE PUMPING STATION.
Interior View of Engine Room.

With reference to the conditions in the vicinity of Roland Avenue and Thirty-sixth Street, this matter is covered by my report to the Commission dated September 13, 1911, and, under the action of the Commission at their meeting on that date, the construction of the storm-water drain referred to in my letter will be undertaken shortly.

Regarding the conditions in the 2000 block Aliceanna Street, this matter was dealt with in my letter of September 11, 1911, to His Honor, the Mayor, a copy of which I enclose herewith.

All of the above-mentioned locations are, with the exception of the first named, in the low-lying sections of the City, which are drained by old existing drains, or where storm-water drains have not yet been constructed. On account of the fact that the City of Baltimore, with a population of about 600,000, has grown to its present size without installing an adequate drainage system, flooding in many sections of the City should be expected during a "maximum" storm of the intensity of that of August 25, 1911.

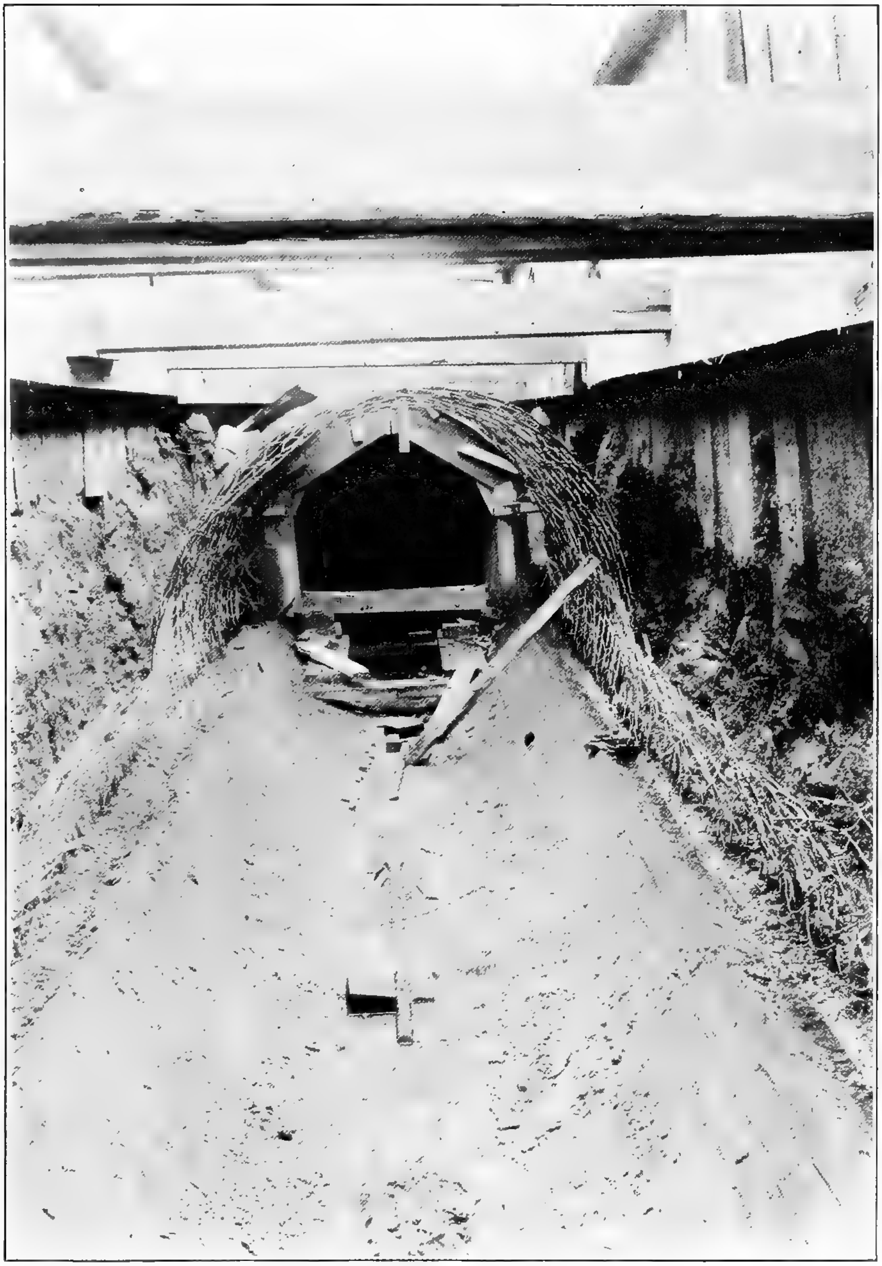
Complete studies of the drainage problem covering the entire City have been made, and the correction of the trouble at the above-mentioned locations is anticipated by the comprehensive plans adopted by the Commission. A great many cases of serious flooding have already been corrected by the installation of storm-water drains according to our plans, and now that the necessary money is available for the completion of the storm-water drainage system, the general installation of storm-water drains, which will correct the flooding at the locations mentioned, will be undertaken in the near future. In fact, plans are now being prepared for storm-water drains to be constructed during the year 1912 for the relief of the conditions set forth in the attached correspondence.

As lawsuits may grow out of the flooding at the locations under discussion, the fact that the flooding was caused by a storm of "maximum" intensity (for which provision is not usually made in the design of storm-water drains) should be given first consideration. The storm in question was the second in severity in the history of the United States Weather Bureau, where records have been kept for many years by means of automatic rain-gauges. This excessive downpour was over 30 minutes in duration, with a recorded rate of rainfall of 6.75 inches an hour. The run-off from urban areas produced by a storm of such severe intensity was much greater than it is customary to care for in the design of storm-water drainage systems. In other words, the run-off was much greater than would have been produced by a 4-inch rainfall, which I understand the Courts have ruled is the maximum to be considered in the design of storm-water drains for the City of Baltimore.

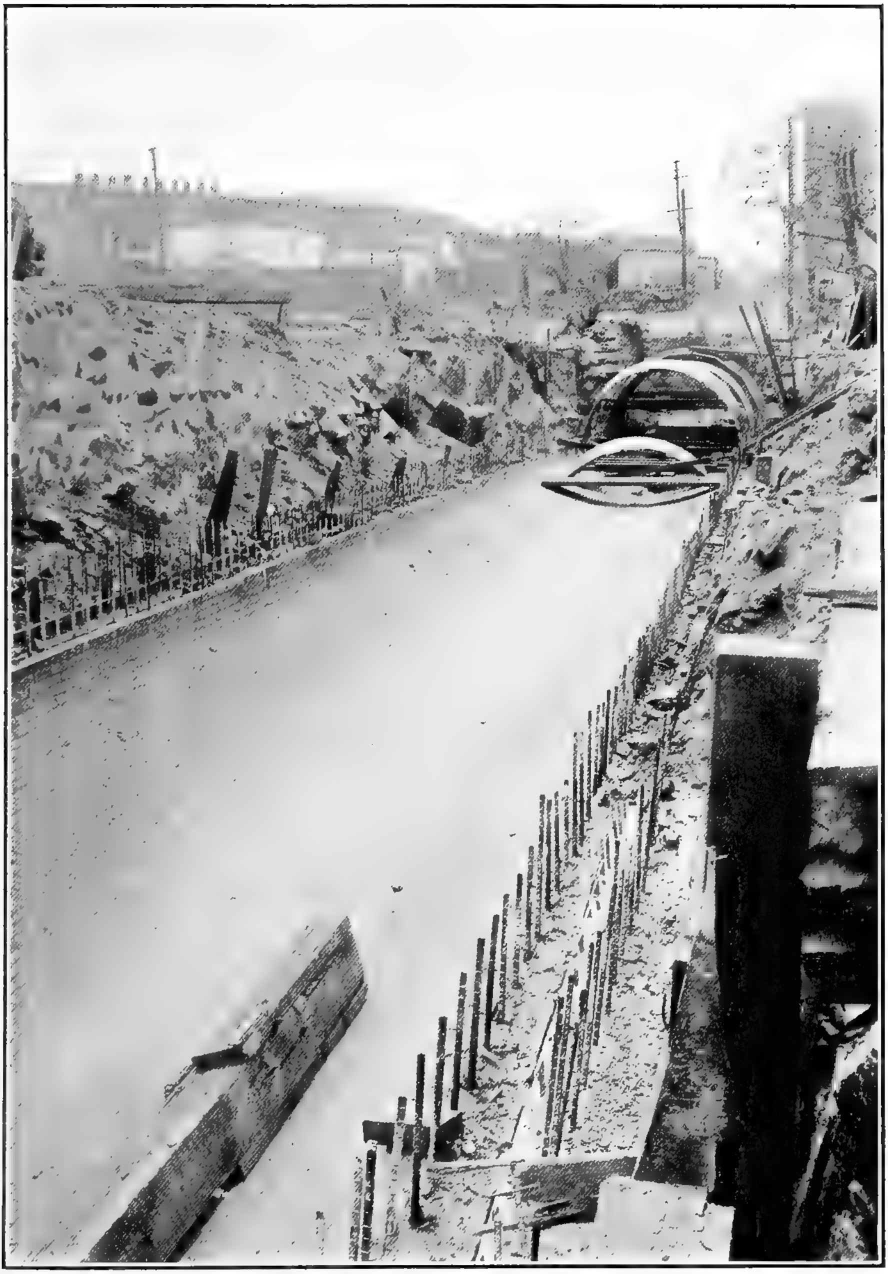
In the larger cities of the world no attempt is made, in designing drainage systems, to provide for the maximum storms. In New York City, in order to protect the city against further suits for damage due to flooding from inadequate sewer capacity, the approval of the plans by the Board of Estimate and Apportionment was qualified by the following note:

> "The sewers shown on the drainage plan are intended to have a capacity adequate for the reasonable needs of the drainage district for a limited period and are not intended to be of adequate size for immediately removing the storm-water when the precipitation is at an *abnormal* rate or when the drainage area shall have become largely or fully improved. The capacity has been thus restricted for the purpose of keeping the cost within limits which it is deemed may be now properly assessed upon property benefited."

It is only natural that sewers and drains built years ago to serve the residential growth of the City should, as the drainage area is developed and as the impervious areas, such as pavements and roofs, increase, gradually show their inability to take care of the increasing quantity of storm-water,



REINFORCED-CONCRETE STORM-WATER DRAIN, 54 INCHES IN DIAMETER, IN SPRINGDALE AVENUE, BETWEEN ELEVENTH AND TWELFTH STREETS.



PECK'S RUN DRAIN, NEAR LEXINGTON STREET AND GWYNN'S FALLS.
Showing Brick Invert and Forms Partly in Place for Reinforced Concrete Drain in the Bed of Peck's Run.

and eventually become nuisances by causing the flooding of adjacent streets and cellars even during comparatively small storms.

Such drains were caused to overflow during the storm of August 25, but the plans of the Commission, when carried out, will relieve the intolerable conditions by the reconstruction of parts of the old drains and by the construction of additional drains in streets where lateral storm-water drains have not yet been constructed, or the diversion of the storm-flow in so-called relief or diversion drains.

In regard to the conditions at Leadenhall and Stockholm Streets, and at Leadenhall and Ostend Streets, where it is shown by the attached correspondence that flooding has occurred in recent years during heavy storms, a careful study has been made of the existing conditions and the character and extent of the drainage area. For a better understanding of the situation a blueprint is hereto attached, showing the drainage area and the existing and proposed storm-water drains.

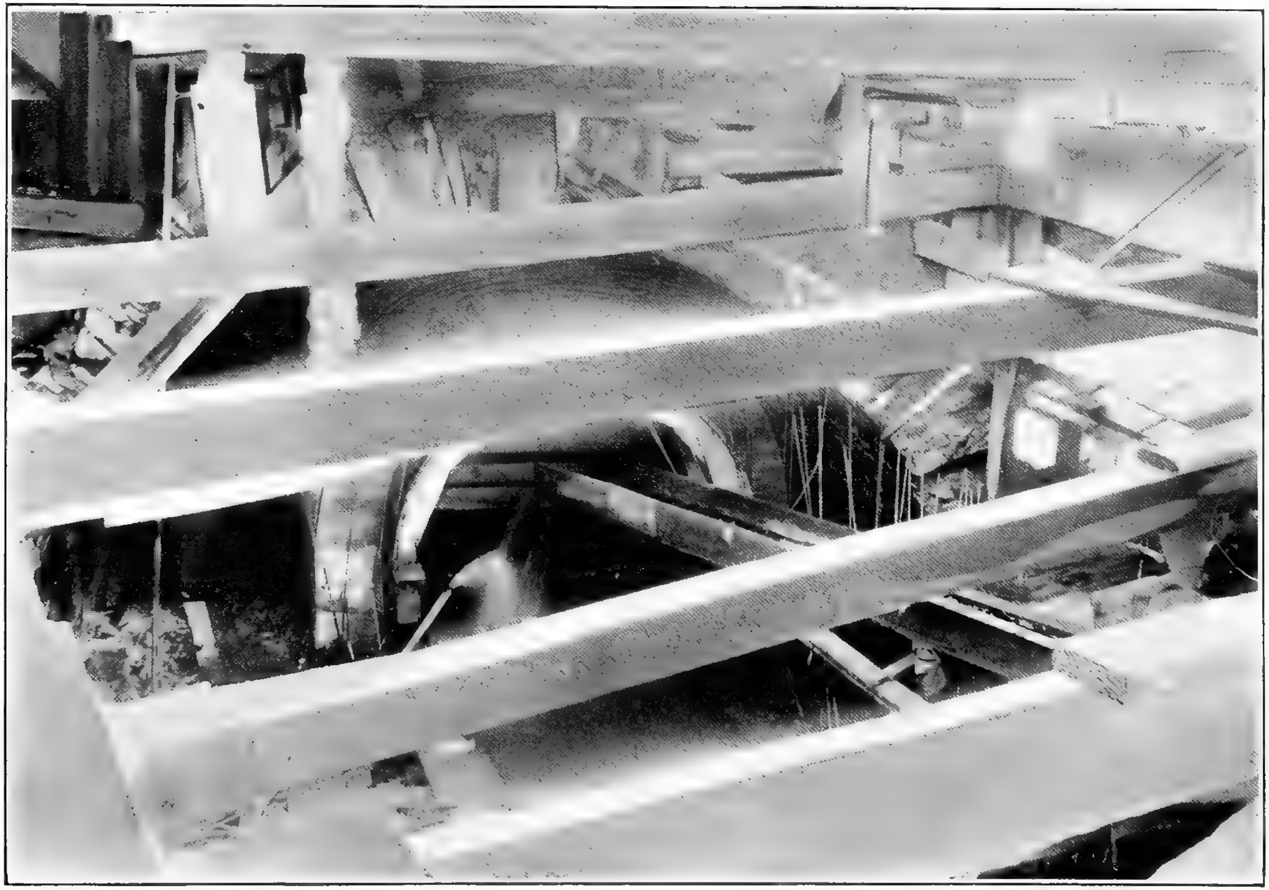
The properties most seriously affected are those of F. X. Ganter & Son, at the northwest corner of Leadenhall and Stockholm Streets, and Furst Brothers, at the northeast corner of Leadenhall and Stockholm Streets. Serious damage resulted to the property of F. X. Ganter & Son, particularly during the storm of August 25, 1911.

This section of the City has been built up on the low-lying flat land adjacent to the Spring Gardens waterfront, and, combined with the reverse slopes due to the incomprehensive system of street grading, has made the problem of drainage in this section of the City very difficult.

This section of the City is now drained by the old Race Street Sewer. This sewer extends from the B. & O. R. R. tracks at Ostend and Leadenhall Streets, through private property to Stockholm Street, to Race Street, to Cross Street, and terminates at Cross and Charles Streets. It has been constructed piece-meal, with a variety of sections, varying in size from a rectangular section 11 feet wide by 5 feet high to a flat arch section with a flat bottom, 11 feet wide by 2½ feet high. Branch sewers were also constructed in Leadenhall and Stockholm Streets in recent years by the City Engineer, which sewers are particularly discussed by the City Engineer and certain of the complainants in the attached correspondence.

By reason of the reverse slopes in the street surfaces in Ostend Street, west of Leadenhall Street, and in Leadenhall Street, north of Stockholm Street, low places, generally known as "sumps," occur opposite the northeast and southwest corners of the Ganter factory. In case of any stoppage in the existing sewers or inlets, or lack of capacity in the same, flooding of this property will necessarily occur. These "sumps" are also the low points in the drainage area of 125 acres. The area in question is only partially drained; long lines of necessary laterals remain unconstructed, so that in times of storm large quantities of rainwater flow over the surface to the nearest inlets on the old trunk drain. The result is, during "maximum" storms, that the rapid accumulation of flood waters at these inlets causes the flooding of the low-lying streets and cellars.

A careful survey was made of the old drains in this territory after the storm of August 25, and it was discovered that a deposit of considerable depth existed on the bottoms of the drains. The outlet section of the Race Street Sewer, between the B. & O. R. R. tracks and Stockholm and Leadenhall Streets, was also found to be in a very bad condition. This section of the sewer is little less than a rough, rectangular stone sewer, with a poorly-paved bottom, and covered with a roof of plank flooring supported by wooden joists. Every six feet of the roof is strengthened by an iron truss-rod extending well into the cross-section of the sewer. These truss-rods, with their collection of filth, tend seriously to reduce the cross-



CONCRETE STORM-WATER DRAIN 96 INCHES IN DIAMETER, CONSTRUCTED INSIDE OF OLD STONE CULVERT UNDER GREENMOUNT AVENUE, SOUTH OF NORTH AVENUE, ON THE LINE OF THE JENKINS RUN DRAIN.

section and, consequently, the capacity of the sewer. This section in particular, the mouth of which is tidelocked and the bottom of which is below tide level, was found to contain considerable amounts of deposits of silt and sewage solids.

The 36-inch circular drains constructed in recent years by the City Engineer and referred to particularly in the attached correspondence, lying in the bed of Leadenhall Street, between West Street and the junction of the old Race Street Sewer south of Stockholm Street, were also found to contain large amounts of deposits.

A considerable portion of the dirt which finds its way into the sewers goes in through the untrapped inlets, and it is a matter of common knowledge that the street cleaners, in order to lighten somewhat their labors, are accustomed to pushing the street sweepings into the inlets, thus allowing large quantities of dirt to be washed into the sewers. It must be borne in mind, however, that it is much more expensive to remove deposits of dirt from the sewers by hand than it is to remove them from the surfaces of the streets by carts.

As the cross-section of the sewer was found to be materially reduced by such deposits at the time of our examination after the storm of August 25, it is reasonable to assume that the cross-section available for storm flows was considerably less before the storm mentioned, as during periods of maximum flow considerable scouring action, with a material reduction of the silt deposits, must have taken place.

If this system of drains had been maintained in a perfectly clean condition at all times, it is undoubtedly true that the capacity of the drains during "maximum" storms, when flooding has occurred in this territory, would have been greatly increased and much less damage would have resulted.

Our calculations show that for a 4-inch rainfall the old drain itself would probably have been adequate, although flooding would have resulted from the rainfall of August 25, where the recorded intensity of the storm was 6.75 inches an hour. Our calculations show, however, that the deposits of silt and debris so reduced the capacity of the drain that during a 4-inch rainfall the hydraulic gradient would reach the street surface a short distance from the outlet.

In addition to the deposits of silt, the 36-inch pipes laid in Leadenhall Street by the City Engineer are inadequate for a 4-inch rainfall. These pipes enter the main drain on the bottom, so that when the latter is flowing full the hydraulic grade lines of these pipes, which were intended to prevent flooding in the vicinity of the Ganter and Furst factories, are so materially reduced that the drain is unable to care for the tributary area. The upper ends of the trunk drain, under such conditions, therefore, refused to relieve the street surfaces of their flood waters and flooding at the low points was the natural result.

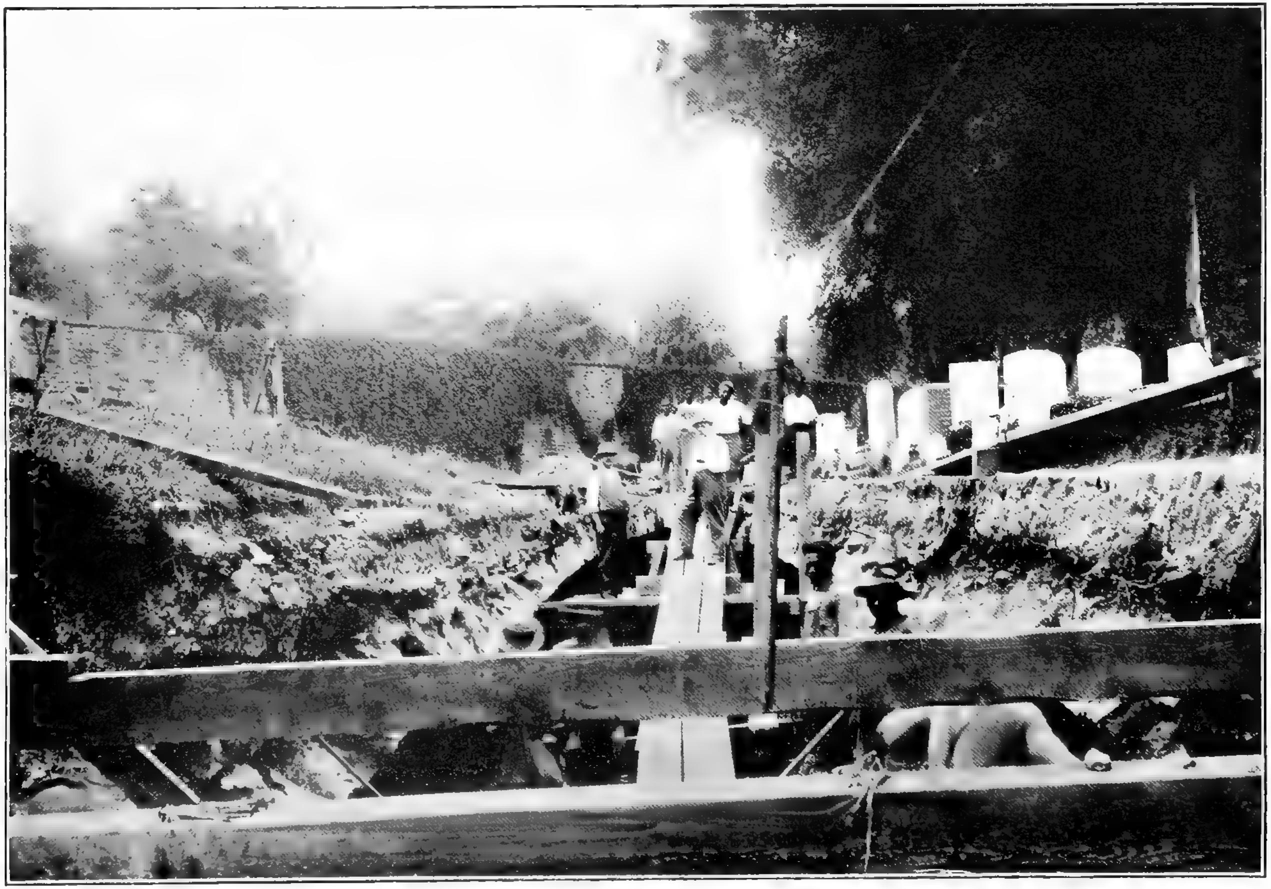
The causes of the flooding in this territory can be summarized as follows:

1. Reduction in capacity of the Race Street Sewer, due to silt deposits.

2. Incapacity of the 36-inch pipes in Leadenhall Street draining the "sumps" at the northeast and southwest corners of Ganter's factory.

3. Lack of lateral storm-water drains, or incompletion of the drainage system for this territory.

The serious flooding which resulted during the storm of August 25 can be practically corrected by the extension of the lateral drains shown on the attached blueprint in red (omitted); the reconstruction of the old portion of the drain through private property, between the points "A" and "B," and the enlargement of the 36-inch pipes constructed in Leadenhall Street, south of Cross Street, in connection with the extension of the lateral drains.



RECONSTRUCTION OF OLD RUBBLE MASONRY DRAIN IN GREENMOUNT CEMETERY.
The Tombstones on the Graves Adjacent to the Work Are Clearly Shown.

In reconstructing the section of the old drain, between the points "A" and "B," south of Leadenhall and Stockholm Streets, the invert grade of the new section should be laid at a much lower elevation in order to confine the hydraulic gradient in the system, as a whole, below the street surface.

The idea seems to have been considered, in designing the old drain, that the drain bottom should have as much slope as possible, in the belief that the bottom slope controlled the velocity of the flow of the drain. This, of course, is a mistaken idea, as the flow of the drain is backed up by the tides and the deposition of silt and solids is favored by the checked velocities.

It will also be both desirable and necessary, after the extension of the laterals and the reconstruction of that portion of the old drain between the points "A" and "B" and the enlargement of the 36-inch pipes existing in Leadenhall Street, south of Cross Street, to introduce catch-basins on the entire system in general, as has been done in the case of the Harrison Street and Saratoga Street Intercepting Storm-Water Drains. This will prevent silt deposits inside the drains, and the removal of street sweepings can be made more cheaply from the catch-basins.

* * * * * * *

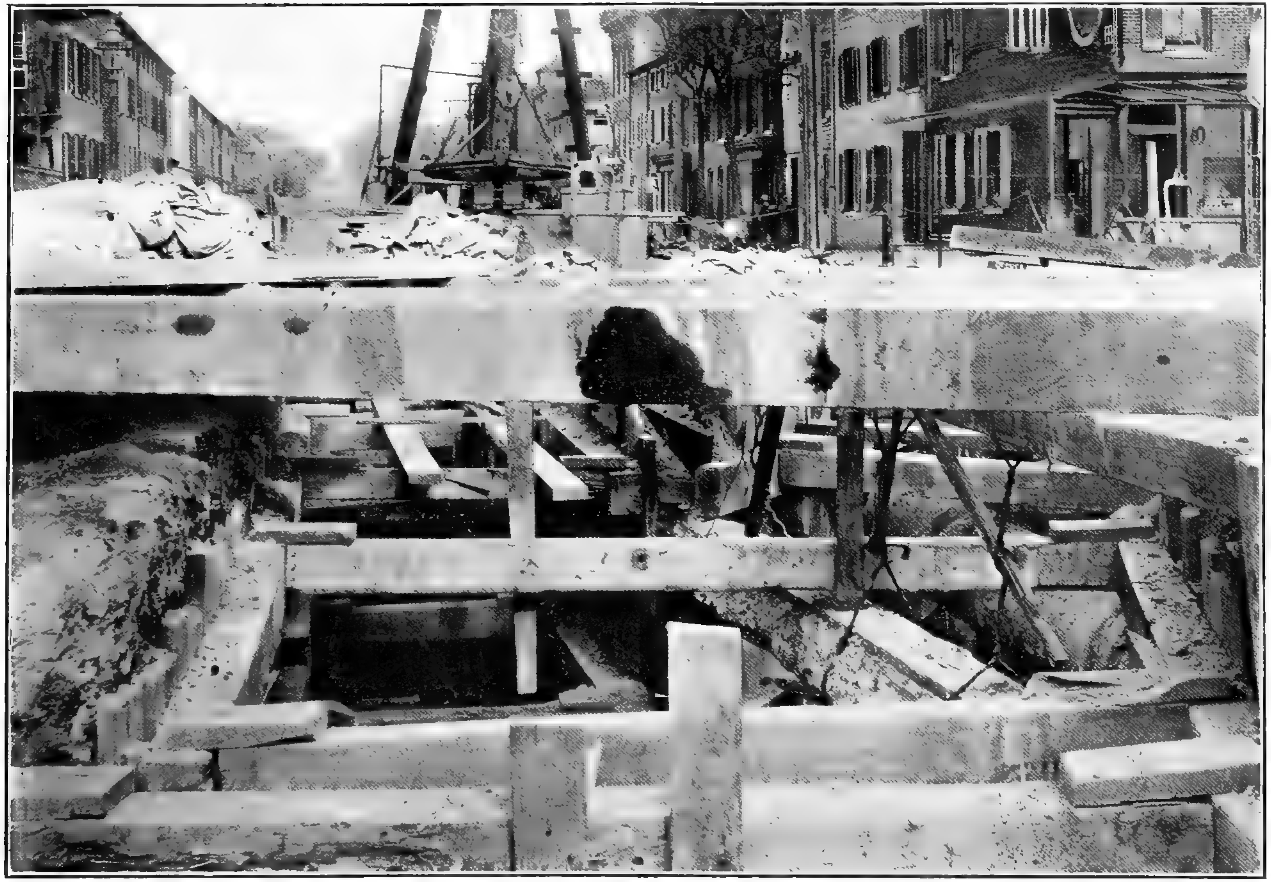
The storm-water appropriation for the year 1912 will cover the improvements above outlined.

In regard to the flooding at North Avenue, east of Slingluff Avenue, which was brought to the attention of His Honor, the Mayor, by Charles Herbold & Sons, who are building a row of houses on the north side of North Avenue, east of Slingluff Avenue, I beg to say that this correspondence is the first intimation we have received of trouble at this point due to the apparent incapacity of the drains, which were constructed by the City Engineer's Department in the last few years, resulting in the overflow of storm-water on the property of the complainant.

There is a pocket in the grade of North Avenue, east of Slingluff Avenue. Inlets have been placed along the curb at the "sump" which connect directly with the culvert carrying Peck's Branch under North Avenue at this point. In case of heavy storms, any deficiency in the capacity of the storm-water drains, or the lack of lateral storm-water drains, would cause the surcharging of the inlets at the "sump" above mentioned. This would necessarily cause the water to overflow the street surface and flood the cellars of adjoining property. It appears that complaint regarding the trouble in this vicinity was first made by Herbold & Sons to the City Engineer, and Mr. Fendall called attention to the fact that the gutters around the inlets had been obstructed by large masses of building material, which had greatly added to the trouble complained of.

On investigating the matter I find also that the street around the inlets was almost completely blocked with building material, such as mortar boxes, paving stone, brick, sand and lumber. It was apparent that, had a heavy storm occurred on the day of our investigation, the inlets would have been entirely cut off. There can be little doubt that the trouble complained of was greatly aggravated by this material.

In connection with the paving of West North Avenue, the City Engineer constructed a drain in North Avenue, between Slingluff Avenue and Windsor Mill Road. Our calculations show that this drain is entirely too small to take care of the flood waters of the drainage area it is intended to drain. In times of "maximum" storms, therefore, large quantities of storm-water would necessarily flow by the inlets appurtenant to the drain, and collect at the "sump" east of Slingluff Avenue. The drain constructed by the City Engineer, however, did not complete the drainage of the area tributary to the "sump" in North Avenue, east of Slingluff Avenue. There still remain unbuilt several lines of lateral storm-water drains. Flooding will necessarily occur at times of exceptional storms unless these lateral drains are completed.



EXCAVATION FOR BELLMOUTH AT MADISON AND EDEN STREETS, ON THE MADISON STREET STORM-WATER RELIEF DRAIN.

The Drains Entering this Bellmouth are 57 and 42 Inches in Diameter, and the Outlet Drain is 69 Inches in Diameter.

I attach hereto a blueprint (omitted) showing the point of flooding, the outlines of the drainage area, and the existing and proposed storm-water drains. In order to relieve the inadequate existing drain west of Slingluff Avenue, it will be necessary to intercept a portion of the territory north and west of Eighth Street and North Avenue by the system of proposed drains, shown in red on the blueprint, west of Slingluff Avenue. The proposed lateral in North Avenue, east of Slingluff Avenue, is also required to take care of the run-off from the drainage area beginning at the summit east of Second Street.

The causes of the flooding at North Avenue, east of Slingluff Avenue, can therefore be summarized as follows:

1. The partial blocking of the inlets by the building material at the "sump" in North Avenue, east of Slingluff Avenue.

2. The inadequacy of the existing drain constructed by the City Engineer.

3. The incompletion of the storm-water drainage system for this area, or the lack of storm-water laterals.

The storm-water appropriation for 1912 covers the proposed drains shown in red on the blueprint. The construction of these drains and the interception of the existing drain should relieve the flooding complained of.

There is no correspondence attached with reference to the flooding at Fairmount and Kenwood Avenues. This matter was brought to our attention, however, by the Law Department, with reference to a claim for damages by certain parties living on Fairmount Avenue, near Kenwood Avenue. Serious flooding is reported to have occurred at this point during the storm of August 25, 1911.

This portion of Fairmount Avenue lies in the Harris Creek Drainage Area and is drained by a 48-inch lateral storm-water drain which connects with the Ogier's Run Trunk Drain at a point in Patterson Park. The Ogier's Run Trunk Drain discharges into the Harris Creek Trunk Drain, which passes through Patterson Park on the line of Lakewood Avenue extended. All of these drains, including the Streeper Street Lateral and the Ogier's Run and Harris Creek Trunk Drains, were constructed by the City Engineer's Department before the present Sewerage Commission was created.

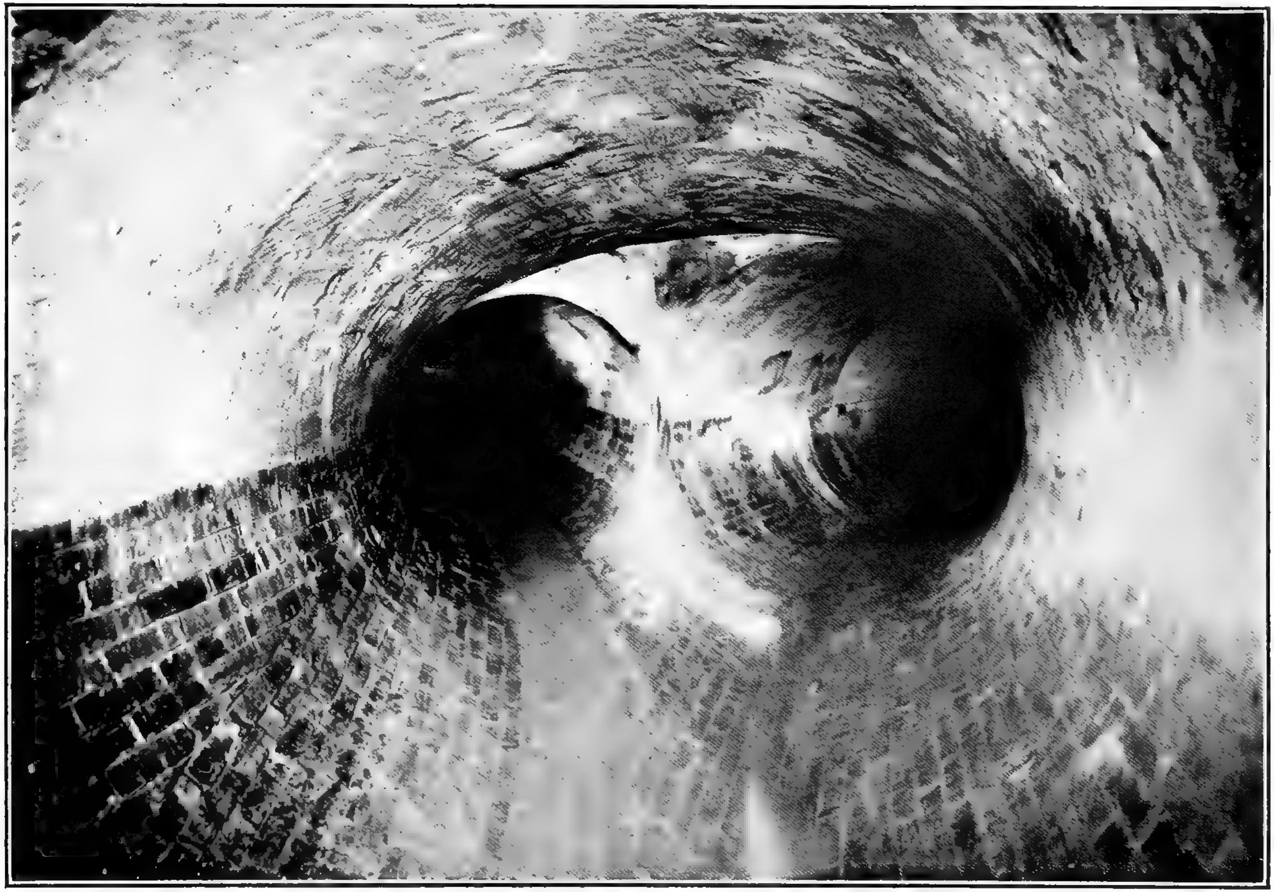
I have had an investigation made of the damage done by the storm, which shows that the cellars of properties on Fairmount Avenue, between Kenwood Avenue and Patuxent Street, were flooded, due to the accumulated depth of storm-water, during the storm of August 25, 1911.

The flooding of these properties was due to the following causes:

1. The insufficient capacity of the Streeper Street Drain, which drains the streets in this vicinity, and the lack of storm-water laterals.

The drainage area tributary to the 48-inch Streeper Street Drain at Fairmount Avenue and Streeper Street is approximately 72 acres. About one-half of this area is properly drained by lateral drains and inlets, and the other half is without storm-water drains. The effect of this is that large volumes of storm-water are caused to flow over the street surfaces, collecting at the low point in the drainage area, which is at the intersection of Fairmount Avenue and Streeper Street, where the properties in question are located. In addition to this fact, the Streeper Street Drain is inadequate to care for the run-off of a drainage area of 72 acres produced by a 4-inch rainfall.

2. The inadequacy of the Harris Creek Trunk Drain, of which the Streeper Street Drain is a lateral. Not only is the lateral drain insufficient, but the trunk drain is also inadequate to care for the run-off of storms of great intensity. The result is that backflooding of the drains causes flooding of the surfaces of the streets at the low points in the drainage area, such as the intersection of Fairmount Avenue and Streeper Street.



MADISON STREET RELIEF DRAIN.

Bellmouth Just West of Eden Street at Junction of 69-Inch, 57-Inch and 42-Inch Drains. A Portion of the Diversion Drain for the Relief of the Old Harford Run Sewer and Central Avenue System.

3. Flooding was to be expected in this drainage area, due to the storm of August 25, 1911, for the reason that the downpour was over 30 minutes in duration, with a recorded rate of rainfall of 6.75 inches an hour. Granting that the old storm-water drains intended for the drainage of this territory are adequate, a certain amount of flooding should have been expected in this instance (even though the drains were of sufficient capacity to care for a 4-inch rainfall); and, therefore, it would seem that the City of Baltimore cannot be held responsible for any damage which was caused by the severe storm of August 25, 1911.

I wish to emphasize the fact that the Sewerage Commission are in nowise responsible for the existence of these old storm-water drains, which are known to be inadequate—the same having been constructed many years ago by the City authorities having charge of drainage matters. I would say, however, that the plans adopted by the Commission are designed to relieve the serious conditions in this vicinity, and the work of relief will be undertaken during the year 1912. This work will involve the construction of the Ogier's Run Relief Drain, intercepting the present Ogier's Run Drain at Lombard and Patuxent Streets, and also the construction of a lateral drain in Patuxent Street, which will intercept the flood waters which concentrate at this intersection during heavy rainfalls, in Fairmount Avenue, between Kenwood Avenue and Patuxent Street.

There is no correspondence attached with reference to the flooding in the 900 block North Bond Street. The cellars in the vicinity of Bond and Abbott Streets were slightly flooded during the storm of August 25, 1911, due to the fact that this territory has not yet been completely drained.

The intersection of Bond and Abbott Streets is graded in the form of a pocket, so that the flood waters from the hills north of Abbott Street and east of Bond Street collect in the said pocket to such an extent that the inlets at Bond and Abbott Streets are not of sufficient size to carry off the flood waters.

We now have under construction a system of lateral storm-water drains, known as the Bond Street System, which will relieve the trouble that occurred during the storm of August 25. This system should be completed before the end of the year.

As pointed out above, it must be borne in mind that the storm of August 25 was of maximum intensity and that the rate of rainfall was much greater than 4 inches an hour, which factor we are using as a basis in the design of the storm-water drainage system.

The 2300 block Boston Street consists of a row of houses on the north side of the street, between Leakin Street and Montford Avenue. This section of the City, along the harbor front between Chester and Luzerne Streets, has not yet been provided with storm-water drains.

The cause of the flooding which has been brought to the attention of His Honor, the Mayor, in the attached petition signed by the residents of the 2300 block Boston Street, was due to the fact that no storm-water drains have yet been constructed in this section of the City. The attached blueprint (omitted) shows the location under discussion and the proposed storm-water drains necessary for the relief of this territory. This system is included in the list of drains to be constructed during the year 1912.

The flooding at Baltimore and Patuxent Streets was of the same nature as that which occurred at Fairmount Avenue and Kenwood Avenue, both of which points are in the same drainage area and only a few hundred feet apart. The causes of the flooding are identical and fully covered by the report of the flooding at Fairmount and Kenwood Avenues.

Yours truly,

(Signed) CALVIN W. HENDRICK,
Chief Engineer.

SEWAGE DISPOSAL PLANT.
Laboratory Building.

The introduction of the storm-water drainage system is bringing a much-needed relief and aiding the development of property, thereby greatly increasing the taxable basis.

Written from here on to page 79 by E.B.M.

SEWAGE DISPOSAL PLANT.

At the Sewage Disposal Plant we have completed and ready for service three hydrolytic tanks, three sludge-digesting tanks, twelve acres of broken-stone sprinkling filters, together with two settling basins—being sufficient to take care of a population of about 300,000. A part of these are now in actual service and additional units will be added in the near future.

The concrete Chemical and Biological Laboratory and Administration Building is practically completed, with the exception of a few finishing touches. It is a very artistic building, designed especially for the purposes for which it is intended, and will be one of the most complete in America.

Through the experiments conducted at the Walbrook Testing Station, we have arranged our Disposal Plant so as to eliminate the sand beds included in the report on the Disposal Plant, made by the Board of Advisory Engineers, thereby saving about $1,000,000 in construction and an annual maintenance cost of $60,000, proving that the laboratory and testing department is a very important adjunct to our great work.

The Disposal Plant is so constructed that if, at any time, we wish to treat the sewage with calcium hypochlorite, or bleaching powder, we can do so.

In this connection, I submit the following interesting statistics regarding the work of the laboratory and testing department at Walbrook.

WALBROOK TESTING STATION.

REASONS FOR ESTABLISHING TESTING STATION AND OBJECTS SOUGHT.

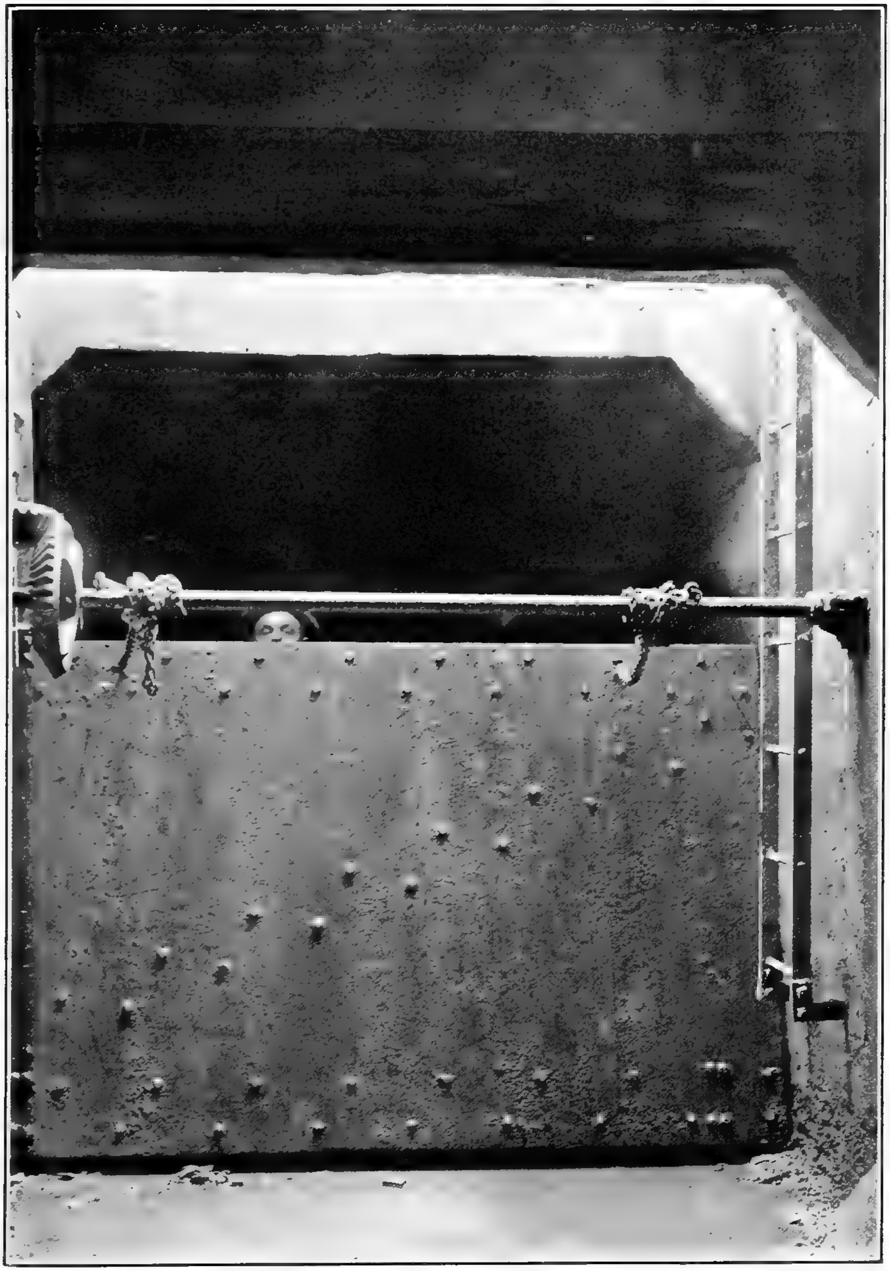
Following out the recommendations of the Advisory Board of Engineers, the Testing Station was designed and a site selected as described in the report of the Commission for the year 1906. The principal objects sought in the investigations at this Testing Station were the determination of the best size of stone to use in the sprinkling filters and the most efficient depths of bed which could be economically constructed.

In regard to the size of broken stone in sprinkling filters, there was considerable difference in practice at different places. The use of fine stone is preferable so long as it remains unclogged, because, other things being equal, it gives a greater degree of purification. On the other hand, the use of coarse stone diminished the tendency to clog.

In regard to the depth of beds, there is a considerable difference of opinion among engineers as to the proper depth to use. If the beds are too shallow, sewage flows through so rapidly that there is no time for purification to take place; while, if the beds are too deep, they do not ventilate as well as the shallower beds, the amount of head consumed becomes an objection and the purification effected for each additional foot of depth is not proportional to the increase in depth of the bed. It was, however, thought possible that the deeper beds would give an effluent sufficiently pure to allow it to be discharged into Back River without requiring any supplementary treatment by intermittent sand filters.

DESCRIPTION OF THE TESTING STATION.

In the original work of the Testing Station, it was not considered necessary to try to secure experimental results from the sedimentation tank, as it was believed by the Consulting Engineers that there had been sufficient data secured at other places to show that a tank with a six to eight hour period of sedimentation gave the best results. The sedimentation tank originally designed had a capacity of approximately 16,000 gallons, which would give eight hours' detention with 50,000 gallons of sewage, but the increased sewage flow over that originally estimated and the rapid accumulation of solids



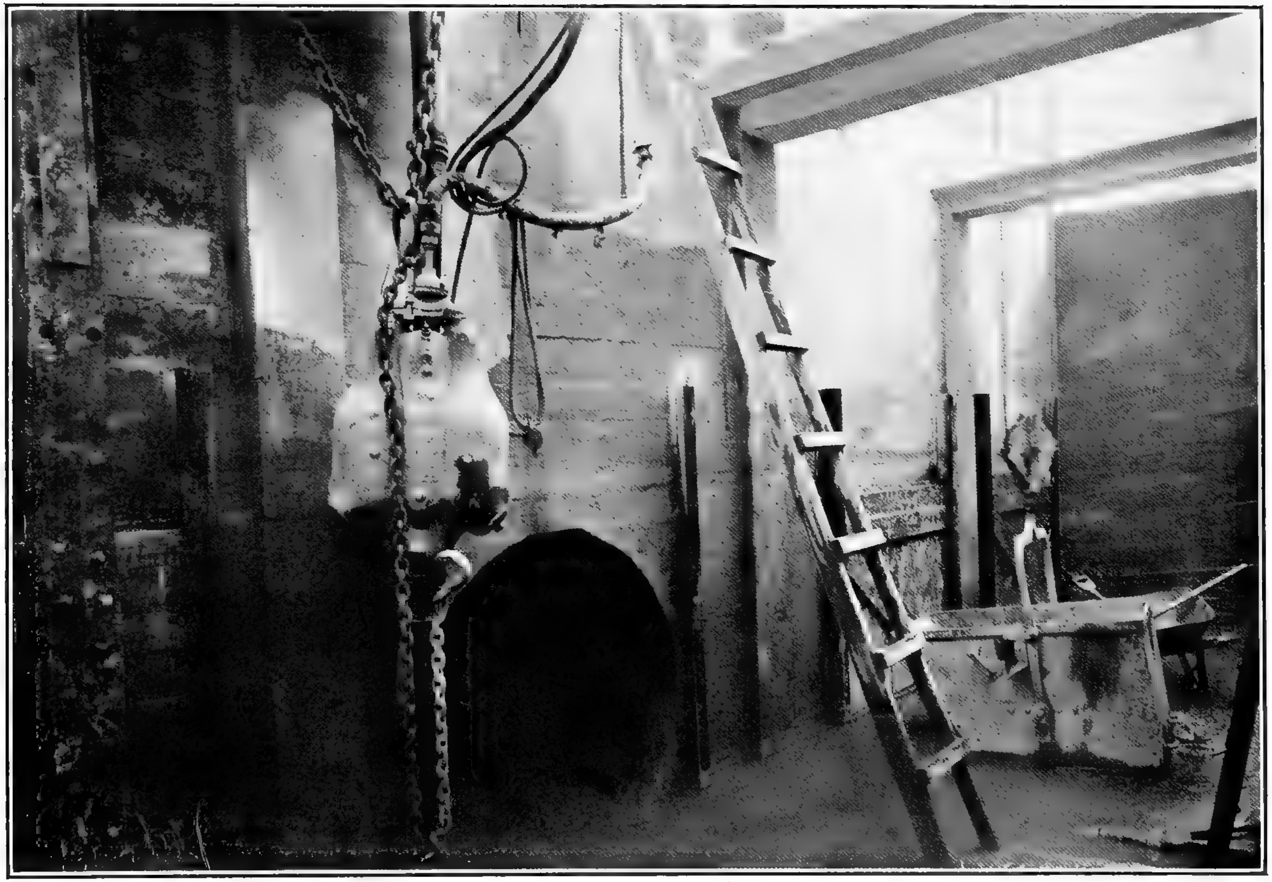
SEWAGE DISPOSAL WORKS.
Adjustable Dam in Discharge Conduit from Power House.

in the tank, due to the freshness of the sewage, greatly shortened the period of detention, and considerable difficulty was experienced in keeping the nozzles of the sprinkling filters from clogging owing to the solid matter passing through the tank. The matters which caused the greater part of the clogging were match sticks and balls of grease. It was finally decided to increase the period of sedimentation by constructing a Dortmund tank between the original tank and the sprinkling filters. This was suggested by the excellent results obtained at Birmingham, England, where a Dortmund tank was placed between a septic tank and the sprinkling filters. The capacity of this Dortmund tank was between five and six thousand gallons. This tank was placed in operation on January 1, 1908.

SPRINKLING FILTERS.

The sprinkling filters were really the important part of the Testing Plant, and the work was designed for the purpose, already noted, of determining the economic depth of filtering material consistent with a high degree of purification, and also to secure a comparison of results obtained by the use of different sizes of stone. Two filtering units were built of approximately an eightieth of an acre each. Each one of these units was sub-divided into six parts containing two beds 6 feet in depth, two beds 9 feet in depth and two beds 12 feet in depth. The unit hereinafter called Filter No. 1 had a bed of each depth filled with ½-inch to 1½-inch stone and a bed of each depth filled with 1-inch to 2-inch stone. The other unit, called Filter No. 2, had a bed of each of the three depths filled with 2-inch to 4-inch and 4-inch to 6-inch stone. The bottoms of the filters were covered with systems of underdrains similar to the half-round tile underdrains used at Columbus, O., with a main drain for each bed into which these half-round drains discharge. The sewage was distributed over the surface of the sprinkling filters by means of revolving arms which made a revolution approximating once a minute. These revolving arms consisted of 4-inch wrought iron pipe, and were caused to rotate by means of electric motors. These arms were perforated and were originally designed for three nozzles so spaced as to give an equal distribution over the surface of the bed. It was found impossible, however, to secure a uniform distribution with the three nozzles, and two additional nozzles were added, giving five nozzles, and with these five nozzles, a practically uniform distribution was secured over the surface of the stone. In fact, this distribution was much more uniform over the entire surface than can ordinarily be obtained in actual practice.

The filters were operated as originally constructed until the month of April, 1908, although no analyses were made of the effluents from the coarse stone beds of 4-inch to 6-inch material after March 5, as the results secured showed the effluents to be so poor that this large stone could not by any possibility be considered for use in the main Disposal Plant. During the months of April and May, 1908, the filtering material was entirely removed from the 6-feet and 9-feet beds containing ½-inch to 1½-inch stone and from the beds of the same depth containing 4-inch to 6-inch stone. In place of the 4-inch to 6-inch stone in the 6-feet and 9-feet beds, a stone 1-inch to 3-inch in size was substituted. The original 6-feet and 9-feet beds, from which the ½-inch to 1½-inch stone was removed, were refilled with 1-inch to 3-inch stone, but only to depths of 4½ feet to 7½ feet, while the 12-feet filter of ½-inch to 1½-inch stone was reduced to a depth of 10½ feet, and the 6, 9 and 12-feet beds of 1-inch to 2-inch stone were reduced to 4½, 7½ and 10½ feet in depth. The object of these changes was to experiment very fully in beds of the different depths with a size of stone which, it seemed at the time, was the most likely to be adopted for use in the main Disposal Plant.



SEWAGE DISPOSAL WORKS.

Terminal Chamber at End of Discharge Conduit from Power House, Showing Openings at Entrance to Wood-stave Pipe.

SETTLING BASINS.

Each of the 12 filters was connected to a small settling basin which was designed to hold two hours' flow of sewage. The increased amount of sewage received at the Station after October reduced this period of detention in the final settling basins—in some cases giving only a little over one hour's detention.

QUALITY OF SEWAGE.

Altogether there are 336 houses connected to the sewers tributary to the Testing Station, and a careful house-to-house canvass was made to ascertain the number of people in these houses. The amount of sewage reaching the Station and the contributing population during the different months are shown by the following table:—

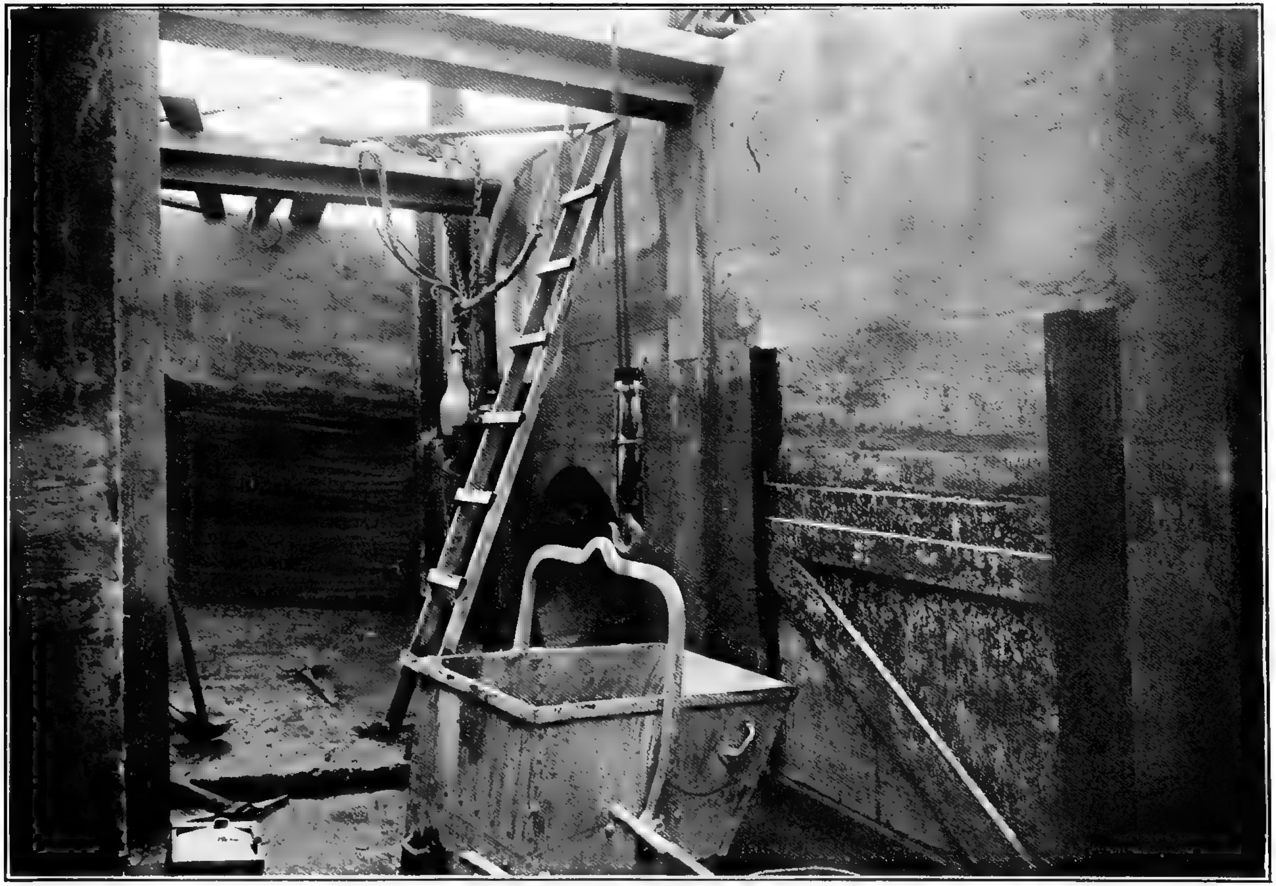
TABLE A.

POPULATION CONNECTED TO WALBROOK SEWERS.

Month—Year.	Population.	Gallons per 24 Hours.	
		Total.	Per Capita.
August, 1907	553	24,400	44
September, 1907	952	55,500	58
October, 1907	1,132	50,100	44
November, 1907	1,206	79,100	66
December, 1907	1,236	79,200	64
January, 1908	1,236	88,900	72
February, 1908	1,236	91,300	74
March, 1908	1,236	79,300	64
April, 1908	1,236	94,854	72
May, 1908	1,236	94,600	72
June, 1908	1,236	70,210	57
July, 1908	1,236	87,533	71
August, 1908	1,236	71,571	59
September, 1908	1,236	76,750	62

The flow of sewage reaching the Station was measured as it passed over a triangular-notch weir, cut in a piece of sheet iron about one-eighth of an inch thick, and arrangements were made so that a float communicated the head of sewage on the weir to a paper record revolved by clock-work, thus making it possible to secure a continuous record of the rate of flow both night and day. The head on the weir was communicated to the paper record through a cam motion designed to make the record reading directly proportional to the flow of sewage. With this arrangement, it was possible to ascertain the amount of sewage passing over the weir each day by measuring the area of the record with a planimeter. This apparatus made it possible to secure very accurate records of the sewage flow during the entire time of the experimental work.

The amount of ground water reaching the sewers varies greatly with the rainfall. In June, 1907, before any houses were connected to the sewers, this ground water flow varied from 8,000 gallons per day in dry weather to 20,000 gallons per day during rainy weather. The length of sewer laid by the contractor in Walbrook amounted to 2¾ miles, so the ground water infiltration amounted at that time to from 2,900 gallons to 7,300 gallons per day per mile. During a heavy storm on June 5, 1907, before any houses were connected to the sewers, the storm flow amounted to 150,000 gallons per day. The greater part of this water was surface water, which entered the sewers chiefly through the ventilation openings in the manhole covers, six ventilation holes, each one inch in diameter, being provided in each cover. Most of the manholes are placed at the low points in the middle of the alleys and during heavy rains the tops of the manholes are flooded, which allows the water to pour into the sewers through all ventilation holes. Considerable water also enters the sewer through the crack between the manhole head and the cover. That the greater part of the water



SEWAGE DISPOSAL WORKS.
Terminal Chamber at End of Discharge Conduit from Power House, Showing Openings for Present and Future Wood-stave Pipe.

passing through the sewers washes from the surface of the ground during a heavy rain was readily seen by the muddy condition of the sewage and the amount of sand and dirt it carried when it reached the Testing Station.

CHARACTER OF SEWAGE.

The sewage was altogether from a residential section, there being no trade wastes of any kind. The buildings, other than residences, in this section were three churches, two drug stores, six grocery and provision stores, two notion stores, one confectionery store, one plumber shop, one laundry, one tailor shop and one shoe repairing shop. None of these buildings, however, contributed any sewage which would have any influence upon the purification process. The sewage from the nearest house reaches the Plant in about fifteen minutes, while the sewage from the most distant house reaches the Station in about twenty-five minutes. It will thus be seen that the sewage is very fresh. The feces reached the Station with very little disintegration, and this condition made it difficult to secure representative samples of raw sewage. As in many other cases where fresh sewage is treated in tanks, a great deal of scum, or floating matter, collected in the tanks.

It is not anticipated that the sewage reaching the main Disposal Plant at Back River will in any way resemble the fresh sewage reaching the Walbrook Testing Station, as the Outfall Sewer alone is more than five miles in length after passing the eastern City limits. The Walbrook tank, although it was designed to hold eight hours' flow of sewage, acted merely as a settling tank, as was evidenced by the presence of nitrates and nitrites in the tank effluent.

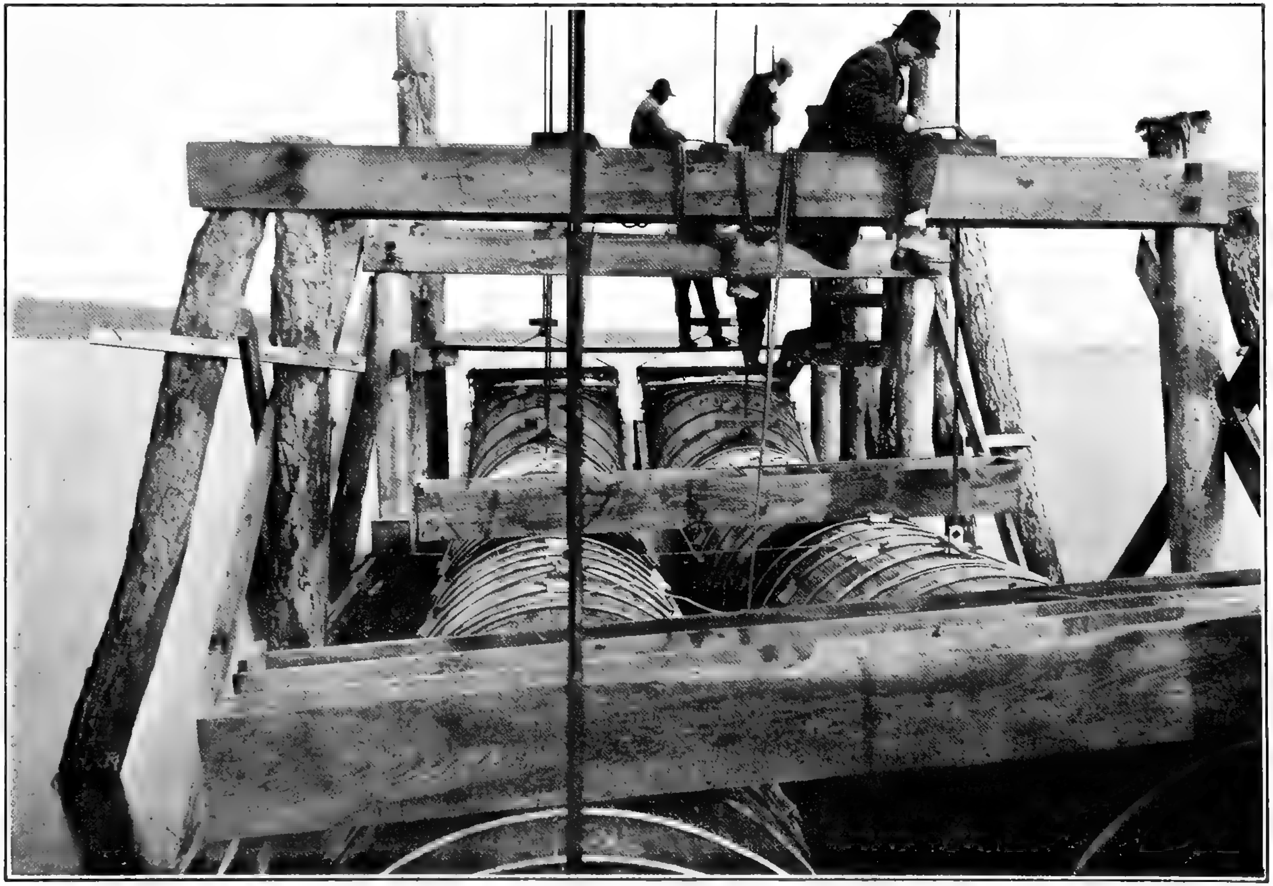
METHODS OF OPERATION.

The filter beds, as described elsewhere, were divided into two entirely separate sets—one consisting of the fine stone beds of ½-inch to 1½-inch and 1-inch to 2-inch stone, and the other consisting of coarse stone beds of 2-inch to 4-inch and 4-inch to 6-inch stone.

When the Station was first put into operation, it was intended to operate and rest the two sets of filters alternately for periods of one week, as recommended at Columbus, O., from the results of the experimental work carried on in that city. However, on account of the small flow of sewage, largely diluted with ground water, which reached the Station after starting operation, the fine stone beds were kept in continuous operation from the starting of the Station on August 1, 1907, to September 20, 1907, in order to give the beds a chance to ripen.

The large stone beds in Filter No. 2 were placed in operation on September 1, but owing to difficulties with the mechanical devices for rotating the sprinkling arm this filter could not be operated regularly until September 20. The sewage, therefore, was kept on the fine stone beds in Filter No. 1 continuously until this date. On this latter date the sewage flow was transferred to the large stone beds in Filter No. 2, which was kept in operation until October 22, at which time the sewage flow was again turned on the fine beds.

It was found that, after periods of rest, the effluent would be very poor for the first day and it required several days' operation to secure an effluent as good as could be obtained when the filters were operated continuously. No evidence was found that the solid accumulations in the filters dried and cracked and peeled from the filtering material, as was stated to be the result in the Columbus works, excepting possibly on the filtering material at the surface of the beds, which was exposed to the drying action of the sun and wind. There was no cracking and peeling of the accumulations on the filtering material within the body of the bed. During periods of operation of the filter, these accumulations were of a glutinous character, but, during the resting periods, this solid matter lost its glutinous character, becoming granular



SEWAGE DISPOSAL WORKS.
Outer End of the Wood-stave Discharge Pipes, Showing Discharge Elbows.

and earthy and rapidly washing through the bed when the operation of the bed was resumed. As, furthermore, sprinkling filters were being operated successfully abroad upon the continuous principle, and had been operating at the Massachusetts Institute of Technology on the same principle, it was decided to operate the filters at the Walbrook Testing Station continuously. This was not only desirable, but the increased quantity of sewage over that originally planned for, practically made it necessary to operate continuously. Therefore, after the first part of December the filters were operated upon the continuous principle, with the exception of short rests, varying in length from a few hours to several days, when a filter would be out of operation on account of mechanical breakdowns in the Station.

Until the middle of March, 1908, the study of the operation of the filters was carried out very thoroughly and systematically. After this time, the beginning of design and construction work in connection with the main Disposal Plant at Back River made it necessary to give an increasing amount of attention to this work, with a consequent lessening in the number of men available for the work at the Testing Station.

The sampling, as described later, was changed so that it covered a period of twelve days instead of a period of three days, in order to lessen the number of routine analyses, thus allowing the analytical work to be done with the men who were available for this purpose. It was also thought desirable to concentrate the work of the Testing Station upon the disinfection of the filter effluents, and a large part of the time of the men who were working at the Testing Station was given to carrying on the disinfection experiments.

Another thing which reduced the time available for the analytical work at the Testing Station was the fact that a considerable portion of the time of the men at the Testing Station was occupied in working up the analytical results already obtained so that these results would be available in connection with the design of the main Disposal Works.

For the above reasons, the results which are shown in connection with the operation of the filter beds after the changes were made in the sizes of stone and depths of filters are not really comparable with the results obtained from the time of commencing operation of the Plant until the middle of March, 1908. Therefore, in comparing the results obtained with different sizes of stone and depths of bed, the results obtained after the changes were made at the Station were not used with the exception of those with 2-inch to 4-inch stone of the three depths and the 4-inch and 6-inch stone of 12 feet depth, none of these beds being affected by the changes.

SAMPLING OF SEWAGE AND EFFLUENTS.

CHEMICAL.

The composite method of collecting samples for routine analyses was followed throughout, and from August 1, 1907, to March 4, 1908, the Station was under very close laboratory observation.

The samples were made up of 50 c. c. portions, taken at intervals as described below, and were preserved in large bottles, by the addition of 10 c. c. of chloroform, until analyses could be completed. From August 1 to January 1, the composite samples covered a period of two days and were made up from small samples taken every hour from the filter effluents and every half hour from the raw sewage and the settled sewage. From January 1 to March 14 the composites covered a period of three days—small samples being taken from effluents every two hours and from the raw sewage and the settled sewage every hour. After this date the composites generally covered a period of twelve days, but in some cases the period was six days—small samples being taken from effluents every four hours and from raw sewage and the settled sewage every two hours.

BACTERIOLOGICAL.

Samples for routine gelatine counts were taken from the raw sewage and the settled sewage daily, and on alternate days from the effluents of the fine stone and coarse stone beds, except at such times as the use of the laboratory apparatus for special work made it necessary to omit the routine work.

METHODS OF ANALYSIS.

Nitrates, oxygen consumed, dissolved oxygen and both total and fixed suspended solids were determined strictly in accordance with the methods of procedure described in the report of the Committee on Standard Methods of Water Analysis to the Laboratory Section of the American Public Health Association. The procedures followed in the other determinations are given below:

ORGANIC NITROGEN.

The method used was substantially that described by Whipple in Vol. IV of the Contributions of the Sanitary Research Laboratory and Experiment Station of the Massachusetts Institute of Technology. Briefly, it is as follows: Fifty c. c. of the sample are digested with 5 c. c. of concentrated sulphuric acid until colorless and the oxidation completed by the addition to the hot acid of a few small crystals of potassium permanganate. After cooling, the digestate is diluted to 250 c. c. and thoroughly mixed. Twenty-five c. c. are then pipetted into a 100 c. c. nessler tube, 25 c. c. of 5% potassium hydrate added, and the whole brought up to volume with ammonia-free water and mixed by pouring. Half the quantity is then filtered and 20 c. c. of the filtrate pipetted into a 50 c. c. nessler tube, diluted to volume with ammonia-free water, mixed by pouring and nesslerized. To obviate any error being introduced by nitrogen-carrying reagents, a control should be run on the entire process. It may also be necessary to wash the filter papers with ammonia-free water. With this procedure no difficulty was experienced in obtaining uniformly clear nesslerizations, and the elimination of the slow distillation process, with its cumbersome apparatus, proved to be a decided advantage.

FREE AMMONIA.

The procedure for direct nesslerization outlined in Standard Methods was followed until, from some unknown cause, it became impossible to obtain clear nesslerizations. Investigation demonstrated that 1 c. c. of a suspension of zinc oxide, 4 grams to the liter, used in place of the copper sulphate, provided a satisfactory coagulant and the procedure was modified accordingly, with the result that no further difficulty was experienced.

NITRATES.

The reduction method was discarded at the outset on account of the time it consumed and in its stead the so-called "Brucine" method was used. This method, though known not to be a delicate one, was considered sufficiently accurate for the purpose in hand. It was thought, however, that perhaps a procedure involving the nitration of some other alkaloid than Brucine might give more satisfactory results and, as the work progressed, investigations were carried on with this idea in view. These investigations resulted in the development of a method in which the basic reagent is the alkaloid narcotine. The detailed procedure which follows was used during the greater part of the work.

Preparation of standards and samples: Five standards are prepared by placing in small 5-inch tubes 1 c. c. of solutions containing, respectively, 0.000000, 0.0000005, 0.000001, 0.000002 grams of nitrogen in the form of potassium nitrate.

Samples of 1 c. c., or less diluted to 1 c. c., are placed in similar tubes, after having been clarified by filtration if necessary.

Preparation of narcotine reagent: 0.1 gram of narcotine is weighed out and dissolved in 50 c. c. of sulphuric acid as quickly as possible, with the aid of a stirring rod. As soon as the narcotine is completely in solution, 2 c. c. of reagent are quickly added to both the samples and the standards and the contents of each tube thoroughly mixed by twirling. Readings are made in from fifteen to twenty-five minutes. By this procedure nitrates can be determined with rapidity and with fair accuracy within a range of 0.5 part per million to 20 parts per million. Below are given the results of a series of determinations made on solutions prepared in the laboratory, but unknown to the operator. The results are expressed in parts per million:

Actual Amounts.	Amounts as Determined.
1.0	1.2
1.5	1.5
3.0	3.0
5.0	6.0
10.0	11.0
30.0	30.0

BACTERIOLOGICAL.

In general, the methods of bacteriological analyses recommended by the Committee on Standard Methods of Water Analysis to the Laboratory Section of the American Public Health Association were followed. For routine observation of the different filter beds, counts were made of gelatine plates incubated at 20° C.

In connection with the experiments in disinfection of filter effluents, gelatine counts, in accordance with the above-mentioned methods, were made, and also counts of litmus-lactose-agar plates incubated at 37° C., which indicated the number of acid-forming bacteria, as well as the total number of bacteria, in the effluents, both before and after the application of bleach solution. In addition, the presence of B. Coli was determined quantitatively by the fermentation of lactose bile; the results being reported as the reciprocal of the highest dilution showing a positive test.

Explanation of Analytical Results.

Individual analyses of the composite samples of sewage and effluents are shown in the tables in Appendix 1. From the results shown in this Appendix, Tables B, C, D and E, showing the average results, were compiled. The average results here shown are not the numerical averages of the results of the analyses given in the appendix, but are the weighted averages—the analyses of the individual composite samples being weighted according to the number of days during which each composite sample was taken.

The analyses of raw sewage, settled sewage, filter effluents and settled effluents are all shown in heavy type. The small type figures above the analytical results for the settled sewage, the filtered effluents and the settled effluents show the percentage reduction based upon the raw sewage. The small type figures immediately below the analytical results of the filtered effluents and the settled effluents show the percentage reduction based on the settled sewage. The second row of small type figures below the analytical results of the settled effluents show the percentage reduction based on the filtered effluents. With these tables as a basis, the diagrams shown in Figures 1 and 2 were plotted, except as to the parts pertaining to relative stability numbers, the information for which was obtained from Table G (pages 67 to 69).

TABLE B

WEIGHTED AVERAGES OF ANALYTICAL RESULTS.

		PARTS PER MILLION										
		SUSP'D SOLIDS			NITROGEN AS							
					ORGANIC							
	DEPTH OF BED	Total	Loss on Ignition	Fixed	Total	Solution	Susp.	Free Ammonia	Nitrites	Nitrates	Oxygen Consumed	Bacteria per C. C.
Raw Sewage		**166**	**135**	**31**	**21**	**16**	5	19	**0.20**	**1.4**	**62**	**2 600 000**
Settled Sewage		57.2 **71**	57.7 **57**	54.8 **14**	23.8 **16**	18.8 **13**	40 **3**	0.0 **19**	**0.17**	**1.1**	19.4 **50**	38.5 **1 600 000**
		½″ TO 1⅛″ STONE										
Filtered Effluent	6′	72.3 **46** 35.2	76.3 **32** 43.9	54.8 **14** 0.0	53.3 **9.8** 38.8	51.3 **7.8** 40.0	60.0 **2.0** 33.3	31.7 **13** 31.6	**0.61**	**11**	66.1 **21** 58.0	88.9 **290 000** 81.9
Settled Effluent	6′	84.9 **25** 64.8 45.7	86.7 **18** 68.4 43.8	77.4 **7** 50.0 50.0	55.7 **9.3** 41.9 5.1	50.0 **8.0** 38.5 -2.6	74.0 **1.3** 56.7 35.6	31.7 **13** 31.6 0.0	**0.59**	**10**	71.0 **18** 64.0 14.3	93.5 **170 000** 89.4 41.4
Filtered Effluent	9′	73.5 **44** 38.0	80.0 **27** 52.6	45.2 **17** -21.4	57.6 **8.9** 44.4	56.3 **7.0** 46.2	62.0 **1.9** 36.7	47.4 **10** 47.4	**0.55**	**15**	74.2 **16** 68.0	94.6 **140 000** 91.3
Settled Effluent	9′	83.1 **28** 60.6 36.4	86.7 **18** 68.4 33.3	67.7 **10** 28.6 41.2	57.6 **8.9** 44.4 0.0	55.0 **7.2** 44.6 2.9	66.0 **1.7** 43.3 10.5	47.5 **10** 47.4 0.0	**0.54**	**16**	75.8 **15** 70.0 6.3	95.4 **120 000** 92.5 14.3
Filtered Effluent	12′	74.1 **43** 39.4	81.5 **25** 56.1	41.9 **18** -28.6	56.7 **9.1** 43.1	51.3 **7.8** 40.0	74.0 **1.3** 56.7	60.5 **7.5** 60.5	**0.57**	**18**	15.8 **15** 70.0	95.4 **120 000** 92.5
Settled Effluent	12′	83.8 **27** 62.0 37.2	88.1 **16** 71.9 36.0	64.5 **11** 21.4 38.9	56.2 **9.2** 42.5 1.1	53.7 **7.4** 43.1 5.1	64.0 **1.8** 40.0 -38.5	59.5 **7.7** 59.5 -2.7	**0.54**	**19**	75.8 **15** 70.0 0.0	95.8 **110 000** 93.1 8.3
		1″ TO 2″ STONE										
Filtered Effluent	6′	52.4 **69** 2.8	62.9 **50** 12.3	38.7 **19** -35.7	43.8 **11.8** 26.3	41.9 **9.3** 28.5	50.0 **2.5** 1.7	21.0 **15** 21.1	**0.72**	**8.4**	56.4 **27** 46.0	91.2 **230 000** 85.6
Settled Effluent	6′	81.3 **31** 56.3 55.1	82.9 **23** 59.6 54.0	74.2 **8** 42.9 57.9	54.3 **9.6** 40.0 18.6	50.0 **8.0** 38.5 14.0	68.0 **1.6** 46.7 36.0	21.0 **15** 21.1 0.0	**0.72**	**8.7**	69.3 **19** 62.0 29.6	92.7 **190 000** 88.1 17.4
Filtered Effluent	9′	69.9 **50** 29.6	75.6 **33** 42.1	45.1 **17** -21.4	52.9 **9.9** 38.1	48.7 **8.2** 36.9	66.0 **1.7** 43.3	42.1 **11** 42.1	**0.85**	**15**	71.0 **18** 64.0	93.5 **170 000** 89.4
Settled Effluent	9′	82.5 **29** 59.2 42.0	85.9 **19** 66.7 42.4	67.7 **10** 28.6 41.2	57.6 **8.9** 44.4 10.1	53.1 **7.5** 42.3 8.5	72.0 **1.4** 53.3 17.6	36.8 **12** 36.8 -9.1	**0.76**	**15**	72.6 **17** 66.0 5.6	94.3 **150 000** 90.6 11.8
Filtered Effluent	12′	75.3 **41** 42.3	80.0 **27** 52.6	54.8 **14** 0.0	54.8 **9.5** 40.6	50.0 **8.0** 38.5	70.0 **1.5** 50.0	54.2 **8.7** 54.2	**0.71**	**18**	72.6 **17** 66.0	94.6 **140 000** 91.3
Settled Effluent	12′	81.9 **30** 57.7 26.8	85.9 **19** 66.7 29.6	64.5 **11** 21.4 21.4	58.6 **8.7** 45.6 8.4	51.9 **7.7** 40.8 3.8	80.0 **1.0** 66.7 33.3	53.7 **8.8** 53.7 -1.2	**0.71**	**18**	75.8 **15** 70.0 11.8	95.0 **130 000** 91.9 7.1

TABLE C.

WEIGHTED AVERAGES OF ANALYTICAL RESULTS.

	Depth of Bed	Parts per Million										Bacteria per C. C.
		Susp'd Solids			Nitrogen as						Oxygen Consumed	
					Organic							
		Total	Loss on Ignition	Fixed	Total	Solution	Susp.	Free Ammonia	Nitrites	Nitrates		
Raw Sewage		**158**	**131**	**27**	**19**	**14**	**5**	**18**	**0.16**	**1.2**	**64**	**3 100 000**
Settled Sewage		56.3 **69**	56.3 **57**	55.6 **12**	15.8 **16**	7.1 **13**	40.0 **3**	0.0 **18**	**0.16**	**1.2**	25.0 **48**	45.1 **1 700 000**
		2″ to 4″ Stone										
Filtered Effluent	6′	63.3 **58** 15.9	66.4 **44** 22.8	48.1 **14** -16.7	43.2 **10.8** 32.5	37.1 **8.8** 32.3	60.0 **2.0** 33.3	11.1 **16** 11.1	**0.52**	**3.0**	57.8 **27** 43.8	86.8 **410 000** 75.9
Settled Effluent	6′	78.5 **34** 50.7 41.4	79.4 **27** 52.6 38.6	74.1 **7** 41.7 50.0	46.8 **10.1** 36.9 6.5	42.1 **8.1** 37.7 8.0	60.0 **2.0** 33.3 0.0	11.1 **16** 11.1 0.0	**0.49**	**3.2**	68.7 **20** 58.3 25.9	89.0 **340 000** 80.0 17.1
Filtered Effluent	9′	58.9 **65** 5.8	63.4 **48** 15.8	37.0 **17** -41.7	40.5 **11.3** 29.4	37.1 **8.8** 32.3	50.0 **2.5** 16.7	22.2 **14** 22.2	**0.72**	**9.2**	67.2 **21** 56.3	84.8 **470 000** 72.4
Settled Effluent	9′	80.4 **31** 55.1 52.3	82.4 **23** 59.7 52.1	70.4 **8** 33.3 52.9	50.5 **9.4** 41.3 16.8	45.7 **7.6** 41.5 13.6	64.0 **1.8** 40.0 28.0	22.2 **14** 22.2 0.0	**0.71**	**8.5**	70.3 **19** 60.4 9.5	91.3 **270 000** 84.1 42.6
Filtered Effluent	12′	69.6 **48** 30.4	74.7 **33** 42.1	44.4 **15** 25.0	48.9 **9.7** 39.4	41.4 **8.2** 36.9	70.0 **1.5** 50.0	33.3 **12** 33.3	**0.78**	**13**	68.7 **20** 58.3	91.7 **290 000** 82.9
Settled Effluent	12′	82.9 **27** 60.9 43.8	84.7 **20** 64.9 39.4	74.1 **7** 41.7 53.3	55.8 **8.4** 47.5 13.4	48.6 **7.2** 36.9 12.2	76.0 **1.2** 60.0 20.0	27.8 **13** 27.8 -8.3	**0.76**	**12**	76.6 **15** 68.8 25.0	92.9 **220 000** 87.1 24.1
		4″ to 6″ Stone										
Filtered Effluent	6′	50.6 **78** -13.0	54.7 **60** -5.3	33.3 **18** -50.0	36.8 **12** 25.0	37.1 **8.8** 32.3	56.0 **2.2** 26.7	-5.6 **19** -5.6	**0.22**	**1.2**	46.9 **34** 29.2	77.4 **700 000** 58.8
Settled Effluent	6′	72.8 **43** 37.7 44.9	74.7 **33** 42.1 45.0	62.9 **10** 16.7 44.4	34.7 **12.4** 22.5 -3.3	30.0 **9.8** 24.6 11.4	48.0 **2.6** 13.3 -18.2	-5.6 **19** -5.6 0.0	**0.27**	**1.2**	54.7 **29** 39.6 14.7	77.1 **710 000** 58.2 -1.4
Filtered Effluent	9′	63.9 **57** 17.4	67.9 **42** 26.3	44.4 **15** -25.0	42.1 **11** 31.3	37.9 **8.7** 33.1	54.0 **2.3** 23.3	-5.6 **19** -5.6	**0.38**	**2.1**	62.5 **24** 50.0	81.0 **590 000** 65.3
Settled Effluent	9′	77.8 **35** 49.3 38.6	79.4 **27** 52.6 35.9	70.4 **8** 33.3 46.7	43.2 **10.8** 32.5 -1.8	37.9 **8.7** 33.1 0.0	58.0 **2.1** 30.0 8.7	-5.6 **19** -5.6 0.0	**0.37**	**2.3**	64.1 **23** 52.1 4.2	83.1 **510 000** 70.0 13.6
Filtered Effluent	12′	65.8 **54** 21.7	70.2 **39** 31.6	44.4 **15** -25.0	49.5 **9.6** 40.0	47.0 **7.3** 43.8	54.0 **2.3** 23.3	16.6 **15** 16.6	**0.64**	**3.9**	68.7 **20** 58.3	84.2 **490 000** 71.2
Settled Effluent	12′	79.1 **33** 52.2 38.9	81.7 **24** 57.9 38.5	66.6 **9** 25.0 40.0	56.8 **8.2** 48.8 14.6	51.4 **6.8** 47.7 6.9	72.0 **1.4** 53.3 39.1	11.1 **16** 11.1 -6.7	**0.54**	**5.1**	68.7 **20** 58.3 0.0	87.1 **400 000** 76.5 22.5

TABLE D.

WEIGHTED AVERAGES OF ANALYTICAL RESULTS

	Depth of Bed	Parts per Million										Bacteria per C. C.
		Susp'd Solids			Nitrogen as						Oxygen Consumed	
					Organic			Free Ammonia	Nitrites	Nitrates		
		Total	Loss on Ignition	Fixed	Total	Solution	Susp.					
Raw Sewage		**98**	**83**	**15**	**13.0**	**10.0**	**3.0**	**16**	**0.06**	**0.9**	**53**	**3 500 000**
Settled Sewage		40.8 **58**	42.2 **48**	33.3 **10**	23.1 **10.0**	13.0 **8.7**	56.7 **1.3**	-12.5 **1.8**	**0.04**	**0.7**	20.8 **42**	28.6 **2 500 000**
		½″ to 1½″ Stone										
Filtered Effluent	10½′	72.4 **27** 53.4	77.1 **19** 60.4	46.7 **8** 20.0	59.2 **5.3** 47.0	55.0 **4.5** 48.3	73.3 **0.8** 38.5	66.9 **5.3** 70.6	**0.35**	**15**	73.6 **14** 66.7	
Settled Effluent	10½′	75.5 **24** 58.6 11.1	81.9 **15** 68.8 21.1	40.0 **9** 10.0 -12.5	57.7 **5.5** 45.0 -3.8	54.0 **4.6** 47.1 -2.2	70.0 **0.9** 30.8 -12.5	66.9 **5.3** 70.6 0.0	**0.28**	**15**	73.6 **14** 66.7 0.0	
		1″ to 2″ Stone										
Filtered Effluent	4½′	53.1 **46** 20.7	56.6 **36** 25.0	33.3 **10** 0.0	38.5 **8** 20.0	37.0 **6.3** 27.6	43.3 **1.7** -30.8	0.0 **16** 11.1	**0.29**	**3.3**	49.1 **27** 35.7	86.6 **470 000** 81.2
Settled Effluent	4½′	79.6 **20** 65.5 56.5	79.5 **17** 64.6 52.8	80.0 **3** 70.0 70.0	46.2 **7.0** 30.0 12.5	36.0 **6.4** 26.4 -1.6	80.0 **0.6** 53.8 64.7	6.3 **15** 16.7 6.3	**0.31**	**3.5**	66.0 **18** 57.1 33.3	89.4 **370 000** 85.2 21.3
Filtered Effluent	7½′	64.3 **35** 39.7	67.5 **27** 43.8	46.7 **8** 20.0	40.0 **7.8** 22.0	34.0 **6.6** 24.1	60.0 **1.2** 7.7	31.3 **11** 38.9	**0.55**	**11**	69.8 **16** 61.9	92.3 **270 000** 89.2
Settled Effluent	7½′	74.5 **25** 56.9 28.6	77.1 **19** 60.4 29.6	60.0 **6** 40.0 25.0	43.8 **7.3** 27.0 6.4	41.0 **5.9** 32.2 10.6	53.3 **1.4** -7.7 -16.7	37.5 **10** 44.4 9.1	**0.54**	**7.9**	66.0 **18** 57.1 -12.5	93.1 **240 000** 90.4 11.1
Filtered Effluent	10½′	67.4 **32** 44.8	71.1 **24** 50.0	46.7 **8** 20.0	46.2 **7.0** 30.0	50.0 **5.0** 42.5	33.3 **2.0** -53.8	57.5 **6.8** 62.2	**0.57**	**17**	67.9 **17** 59.5	93.8 **250 000** 90.0
Settled	10½′	73.5 **26** 55.2 18.8	79.5 **17** 64.6 29.2	40.0 **9** 10.0 -12.5	56.9 **5.6** 44.0 20.0	56.0 **4.4** 49.4 12.0	60.0 **1.2** 7.7 40.0	57.5 **6.8** 62.2 0.0	**0.53**	**16**	77.4 **12** 71.4 29.4	92.9 **230 000** 90.8 8.0
		1″ to 3″ Stone										
Filtered Effluent	4½′	64.3 **35** 39.7	67.5 **27** 43.8	46.7 **8** 20.0	38.5 **8.0** 20.0	36.0 **6.4** 26.4	46.7 **1.6** -23.1	0.0 **16** 11.1	**0.33**	**2.2**	52.9 **25** 40.5	81.4 **650 000** 74.0
Settled Effluent	4½′	73.5 **26** 55.2 25.7	74.7 **21** 56.3 22.2	66.7 **5** 50.0 37.5	40.0 **7.8** 22.0 2.5	35.0 **6.5** 25.3 -1.6	56.7 **1.3** 0.0 18.8	0.0 **16** 11.1 0.0	**0.29**	**1.8**	56.6 **23** 45.2 8.0	
Filtered Effluent	7½′	72.4 **27** 53.4	75.9 **20** 58.3	53.3 **7** 30.0	40.0 **7.8** 22.0	36.0 **6.4** 26.4	53.3 **1.4** -7.7	18.8 **13** 27.8	**0.80**	**4.0**	67.9 **17** 59.5	86.6 **470 000** 81.2
Settled Effluent	7½′	74.5 **25** 56.9 7.4	77.1 **19** 60.4 5.0	60.0 **6** 40.0 14.3	41.5 **7.6** 24.0 2.6	36.0 **6.4** 26.4 0.0	60.0 **1.2** 7.7 14.3	12.5 **14** 22.2 -7.7	**1.03**	**3.6**	66.0 **18** 57.1 -5.9	

TABLE E.

WEIGHTED AVERAGES OF ANALYTICAL RESULTS.

		PARTS PER MILLION										
		SUSP'D SOLIDS			NITROGEN AS						Oxygen Consumed	
					ORGANIC			Free Ammonia	Nitrites	Nitrates		
	DEPTH OF BED	Total	Loss on Ignition	Fixed	Total	Solution	Susp.					Bacteria per C. C.
Raw Sewage		**113**	**92**	**21**	**12**	**8.5**	**3.5**	**16**	**0.07**	**0.6**	**52**	**5 500 000**
Settled Sewage		49.6 **57**	45.7 **50**	66.7 **7**	0.0 **12**	−5.9 **9**	14.3 **3**	12.5 **18**	**0.03**	**0.6**	28.9 **37**	45.5 **3 000 000**
		1″ TO 3″ STONE										
Filtered Effluent	6′	66.4 **38** 33.3	69.6 **26** 44.0	52.4 **10** −42.9	39.2 **7.3** 39.2	37.6 **5.3** 41.1	42.9 **2.0** 33.3	18.8 **13** 27.8	**0.85**	**5.3**	57.7 **22** 40.5	92.2 **430 000** 85.7
Settled Effluent	6′	77.9 **25** 56.1 34.2	76.1 **22** 56.0 21.4	85.7 **3** 57.1 70.0	43.3 **6.8** 43.3 6.8	41.2 **5.0** 44.4 5.7	48.6 **1.8** 40.0 10.0	18.8 **13** 27.8	**0.63**	**4.8**	65.4 **18** 51.4 18.2	
Filtered Effluent	9′	69.9 **34** 40.4	71.7 **26** 48.0	61.9 **8** 14.3	50.0 **6.0** 50.0	47.1 **4.5** 50.0	57.1 **1.5** 50.0	37.5 **10** 44.4	**1.10**	**11**	75.0 **13** 64.9	94.0 **330 000** 89.0
Settled Effluent	9′	81.4 **21** 63.2 38.2	81.5 **17** 66.0 34.6	81.0 **4** 42.9 50.0	56.7 **5.2** 56.7 1.3	47.1 **4.5** 50.0 0.0	80.0 **0.7** 76.7 53.3	37.5 **10** 44.4	**1.00**	**12**	71.1 **15** 59.5 −15.4	

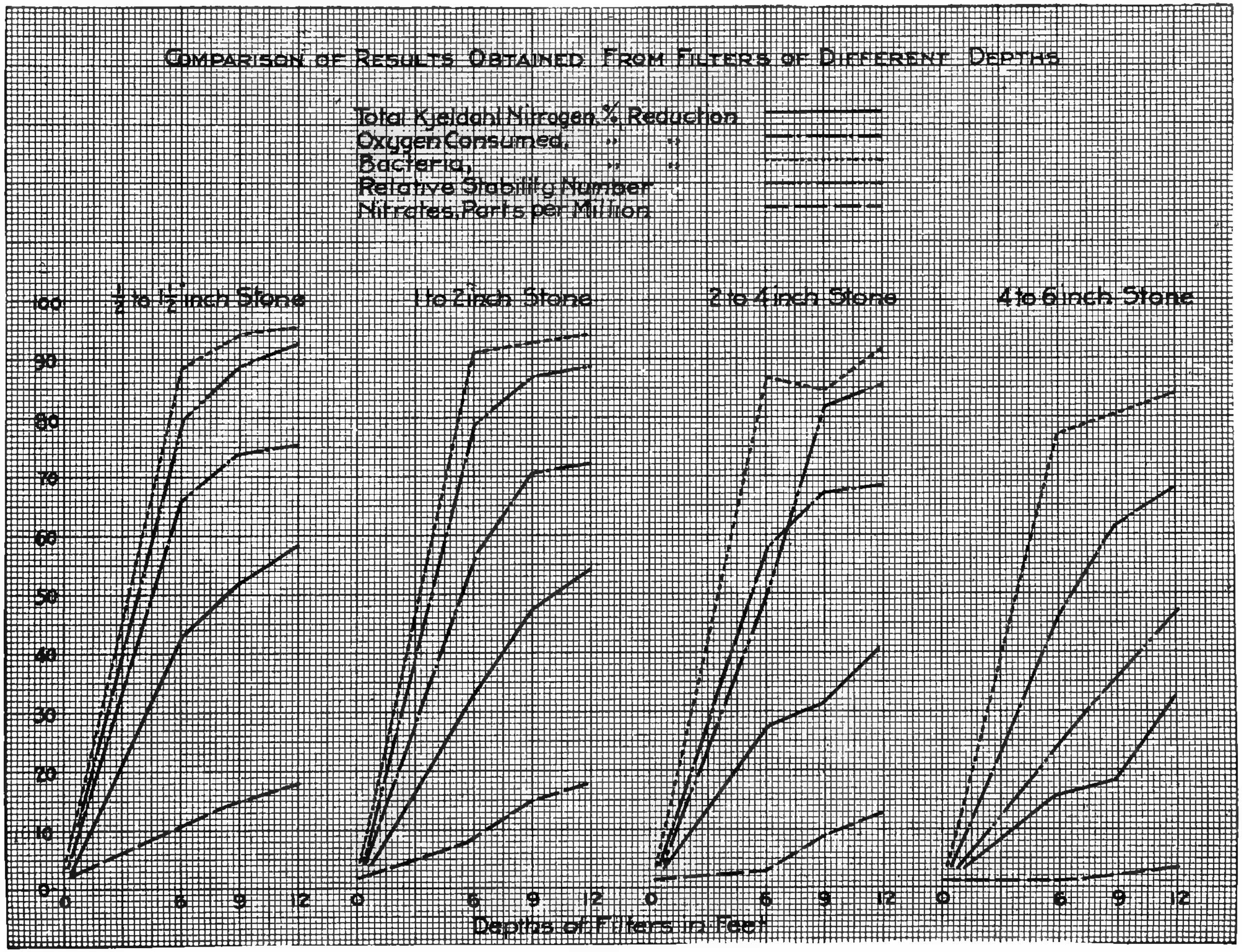
COMPARISON OF RESULTS OBTAINED FROM DIFFERENT DEPTHS OF BED AND SIZES OF STONE.

Figure No. 1, showing the comparison of results from filters of varying depths, brings out very strikingly the fact that the amount of purification per foot of bed decreases as the bed increases in depth, with the exception of nitrification, which seems to vary almost directly as the depth of the bed. This information for each size of stone is particularly valuable in determining the depth of bed to be used to secure a certain required degree of purification.

In the case of Baltimore, where it was required that the highest practicable degree of purification be obtained, the desirable depth, as indicated by these diagrams, has been decided to be 9 feet. A study of the diagrams will show that there is a considerable increase of purification between the depths of 6 feet and 9 feet, while the increased purification between depths of filters of 9 feet and 12 feet is relatively small. The beds at the Sewage Disposal Plant at Back River, as designed and constructed have an average depth of 8½ feet. It was considered that a depth of 8½ feet, with the form of underdrain used at Back River, namely, slotted, flat tile slabs laid over grooves in the concrete floor, would give a purification equivalent to a bed 9 feet in depth where the underdrains consist of half-round tile covered with coarse stone to a depth of about 6 inches, as was the case at the Walbrook Testing Station.

Figure No. 2 gives a comparison of the results obtained with the four different sizes of stone in the same depths of bed. This figure shows how much better is the purification secured with the smaller sizes of stone than with the larger sizes. There is not a great deal of difference between the purification obtained from the ½-inch to 1½-inch stone and that obtained from the 1-inch to 2-inch stone. There is a considerable decrease in the purification obtained from the 2-inch to 4-inch stone as compared with that obtained from the 1-inch to 2-inch stone, while there is a great decrease in the purification obtained from the 4-inch to 6-inch stone, as compared with the 2-inch to 4-inch stone.

There is no question but that the degree of purification increases very considerably as the size of stone decreases, and the only reason for limiting the smallness of the stone arises from the fact that the small stone clogs very much more readily than the coarse stone. In operating the filters at the Testing Station, the fine stone beds were placed in operation on August 1, and were operated continuously until September 20, after which time they were rested from September 20 to October 22. They were then operated from October 23 to October 29; rested from October 30 to November 6; operated from November 7 to November 15; rested from November 16 to November 20; operated from November 21 to November 28, and rested from November 29 to December 2. After December 2 these filters were operated continuously until the first part of May, excepting for an occasional shut-down, lasting from several hours to a couple of days, when the filter would be turned off in order to fix the mechanism for operating the sprinkling arm. Under these conditions of operation the fine stone beds of ½-inch to 1½-inch stone showed evidences of surface clogging by the sewage standing in pools on November 11. On November 21 these beds were raked with a hand rake to try to break up the surface clogging. This raking was not very effectual, and on December 9 the fine stone beds were again beginning to clog badly. It was also noticed at this time that the surface of the beds composed of 1-inch to 2-inch stone was beginning to clog, and, on December 16, the surfaces of the beds composed of both the ½-inch to 1½-inch stone and the 1-inch to 2-inch stone were picked to a depth of 8 to 10 inches—this work being done with an ordinary pick. This stopped the clogging for a time, but by the middle of January the surfaces of all


COMPARISON OF RESULTS OBTAINED FROM FILTERS OF DIFFERENT DEPTHS
Total Kjeldahl Nitrogen % Reduction
Oxygen Consumed, " "
Bacteria, " "
Relative Stability Number
Nitrates, Parts per Million
½ to 1½ inch Stone
1 to 2 inch Stone
2 to 4 inch Stone
4 to 6 inch Stone
100
90
80
70
60
50
40
30
20
10
0
0
6
9
12
Depths of Filters in Feet

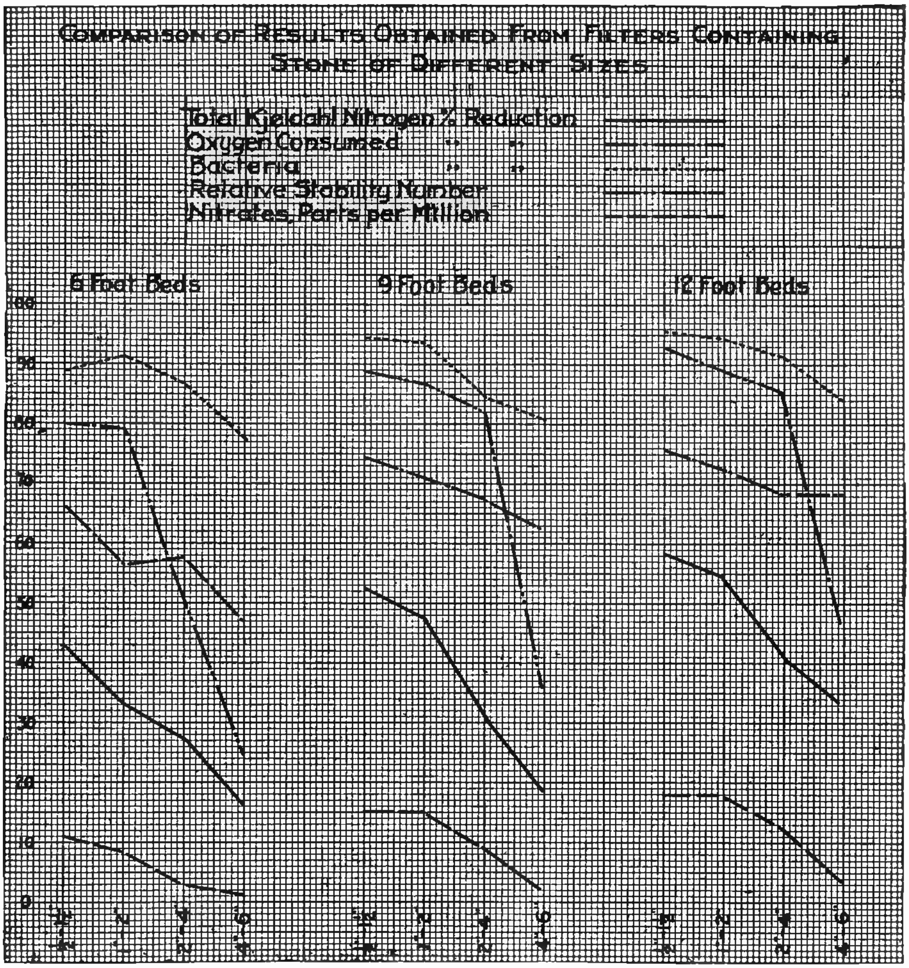

Comparison of Results Obtained From Filters Containing Stone of Different Sizes
Total Kjeldahl Nitrogen % Reduction
Oxygen Consumed " "
Bacteria " "
Relative Stability Number
Nitrates, Parts per Million
6 Foot Beds
9 Foot Beds
12 Foot Beds
100
90
80
70
60
50
40
30
20
10
0

Figure 2.

these beds were again beginning to show evidences of bad surface clogging and, on January 15, the upper part of the beds was again picked loose. About one month later the surfaces of these beds were again badly clogged and, on February 18, they were again picked. About one month later these filter surfaces were again badly clogged and orders had been given to pick the surfaces of the filters at the first opportunity. At this time, however, about the middle of March, there occurred a very warm spell of weather, the thermometer going up to above 80° F. There had been a delay in picking the surface of the beds, and after two or three days of this warm weather it was found that the beds had cleared themselves—all pooling showing on the surface of any of the six beds of the finer material having disappeared. From this time, during the rest of the Spring and Summer, there was no difficulty experienced with the clogging of the filters.

This experience indicates that there is very little danger of clogging of the surfaces with ordinary rates of application, excepting during the cold, winter months, and would also indicate that a smaller stone could be used in warmer climates than it is possible to use in the colder climates of the North.

No difficulty was experienced at any time with clogging of the large 4-inch to 6-inch stone. There was a little pooling of sewage on the surface of the 2-inch to 4-inch stone, but this was never serious enough to require the surface being picked over as was the case with the finer beds. The rates of filtration, and the population per acre, contributing sewage to these beds was very high, as shown by Table F. It will be noticed in this table that, during each month, there was a wide variation in the rates of filtration. This wide variation was caused by the fact that it was necessary to treat on the beds all the sewage that was received at the Station, and the variation in the rates was due to the varia-

PERIOD COVERED, 1907-1908.	Rate of Filtration in Million Gallons per Acre per Day.			Population per Acre Foot.		
	Maximum Daily.	Minimum Daily.	Average.	Six-Foot Beds.	Nine-Foot Beds.	Twelve-Foot Beds.
Beds Composed of ½-inch to 1½-inch and 1-inch to 2-inch Stone.						
August 1 to September 1	3.1	1.3	1.9	7,372	4,915	3,686
September 4 to September 17	3.8	2.6	3.2	12,685	8,457	6,343
October 22 to October 27	5.1	2.8	3.6	15,090	10,060	7,545
November 21 to November 26	5.3	2.2	3.4	8,242	5,362	4,022
December 3 to December 29	5.5	2.3	2.8	8,242	5,495	4,121
January 7 to January 30	5.2	2.8	3.7	8,242	5,495	4,121
February 2 to February 25	4.6	2.5	3.6	8,242	5,495	4,121
March 1 to March 24	5.0	3.0	3.3	8,242	5,495	4,121
March 27 to April 29	5.5	3.0	4.4	8,242	5,495	4,121
April 30 to May 7	5.5	5.2	5.3	8,242	5,495	4,121
Beds Composed of 2-inch to 4-inch and 4-inch to 6-inch Stone.						
September 20 to October 3	4.0	2.9	3.6	12,685	8,457	6,343
October 6 to November 4	5.1	1.4	3.2	15,090	10,060	7,545
November 15 to November 29	5.3	2.0	4.1	16,086	10,724	8,043
December 11 to December 16	5.5	2.5	4.0	8,242	5,495	4,121
January 6 to January 21	5.2	3.1	3.6	8,242	5,495	4,121
February 3 to February 26	4.8	2.5	3.7	8,242	5,495	4,121
February 29 to March 23	5.0	3.0	3.2	8,242	5,495	4,121
March 28 to April 10	4.1	3.0	3.6	8,242	5,495	4,121
July 13 to August 8	5.6	4.4	5.1	8,242	5,495	4,121
September 7 to October 3	5.6	4.8	5.2	8,242	5,495	4,121

tion in the daily quantities of sewage reaching the Plant, which was at times considerably increased by rainy weather. The variation in the population per acre during the first months of operation is due to the fact that all the houses were not connected to the sewers until sometime in November, and also to the fact that, during the earlier months of operation, the entire amount of sewage was being treated on either Filter No. 1 or Filter No. 2 alone, while after November both Filters No. 1 and No. 2 were in practically continuous operation. From a study of the actual rates of filtration, and the population per acre tributary to the Testing Station, it would seem that the recommendation of the Advisory Engineers, i. e., that the rate of filtration be limited to two and one-half million gallons per acre per day, representing a population per acre of approximately 20,000, is very conservative. In all probability, it will be possible to secure satisfactory results at the Sewage Disposal Plant at Back River with a higher rate of application of sewage to the filters than that recommended by the Advisory Engineers.

The average daily volume of sewage treated at the Testing Station during the first ten months of 1908 was 82,300 gallons, equal to 3,300,000 gallons per acre per day, representing a population of 50,000 per acre; but when it is considered that the sewage reaching the Walbrook Testing Station carried absolutely no manufacturing refuse, and that a considerable percentage of the people living in the houses connected to the Walbrook sewers were away from their homes during the day—at their places of business—it is evident that the quantity of applied organic matter per acre at the Testing Station was not so much greater than that which is to be expected at the main Disposal Plant, as would be indicated by the great difference between the popluation per acre tributary to the Testing Station and that estimated for the main Disposal Plant at Back River.

As a result of the study of Figure No. 2, and the experience with the clogging of the finer stone beds at the Walbrook Testing Station, it was decided to adopt, for use at the main Disposal Plant, a size of stone that would pass through a 2½-inch circular opening and be caught upon a screen with a 1-inch circular opening. It was considered that this stone would strike the most satisfactory balance in giving the required degree of purification without undue clogging. Should clogging take place, the experience at the Walbrook Testing Station with picking the surfaces of the filters would indicate that the filter surfaces could be harrowed, giving the same results in preventing clogging at the main Disposal Plant as were secured at the Testing Station by hand picking.

PUTRESCIBILITY TESTS.

When coarse-grained filters are used in the purification of sewage, there are much larger amounts of organic matter left in the filter effluents than is the case with the older methods of purification, and the analytical methods referred to above fail to indicate the character and condition of the organic matter which is left in such effluents. In the older methods of sewage purification, such as sand filtration, there is an almost complete removal of suspended organic matter and a complete oxidation of the nitrogen in solution, and the analytical methods employed were for the purpose of testing the efficiencies of the filters in accomplishing these ends.

With the development of coarse-grained filters, it became evident that their functions are quite different from those of sand filters, and it has become necessary to examine the resulting effluents from a new point of view. The removal of organic matter is far from complete, and the question of the stability, or the nonputrefactive condition, of this organic matter becomes one of prime importance. This has been generally recognized, and a number of tests for the stability of the effluents have been devised for determining this point.

At the time the Testing Station work was started, a study was made of the literature on the subject of the various methods of determining the stability of coarse filter effluents, and from these the methylene blue test was selected, as it seemed to be the simplest and most practical of the various forms of putrescibility tests that were in use. This method of determining the stability of a coarse-stone filter effluent was studied in comparison with several other methods and the conclusions were that it was the most scientific and practical to use.

In studying the methylene blue tests three samples of settled effluents from the various filter beds were taken. One of these samples was used for immediate determination of the available oxygen in the effluent in the form of dissolved oxygen, nitrates and nitrites. The two remaining samples were incubated at 37° C. To one of these samples was added 1 c. c. of a one-tenth of one per cent. (0.001) solution of methylene blue. Upon the disappearance of the blue color, or after holding the samples for a number of days without the color disappearing, determinations of dissolved oxygen, nitrates and nitrites were made of the third sample, which had been incubated under identically the same conditions as the sample treated with methylene blue.

From an examination of the tables in Appendix 2, showing the studies of available oxygen in the methylene blue tests, it will be seen that the available oxygen in the three forms mentioned had practically disappeared in substantially all cases where the blue color disappeared, and, where the blue color was retained, it was found in by far the greater number of cases that there was still oxygen available in one of the three above-mentioned forms. In a few cases, where the blue color was retained, but where there was no available oxygen in any of the three forms present, or where there was available oxygen present when the color had disappeared, an explanation can be found in the fact that the samples were not absolutely identical in character. The conclusions which were reached were that, as long as there is any oxygen available in either of the three forms mentioned, the effluent would not putrefy, and the methylene blue color would be retained. Therefore, this method was adopted as one of the routine methods of analysis in carrying out the work of the Testing Plant, and in Appendix 2 are given tables showing the relative stability numbers as determined by the methylene blue tests from all of the filters. These relative stability numbers were worked out in the manner described in the paper by Professor Earle B. Phelps, as published in Water Supply Paper 229 of the United States Geological Survey. The average results of the stability numbers, as determined from month to month in the different beds, are shown in Table G. These results are also shown in Figures 1 and 2, in connection with the study of the comparative results secured from the different depths of bed and with the different sizes of stone.

In Appendix 2 there is also a table showing the comparison of 37° C. incubation tests of filtered and settled effluents, giving the time the methylene blue color was retained. This table indicates very strikingly the value of settling the coarse filter effluents, especially if the effluents are not of the highest character.

DISINFECTION OF SPRINKLING FILTER EFFLUENTS.

As has previously been stated, experiments were carried out at the Testing Station to determine the feasibility of disinfecting sprinkling filter effluents with calcium hypochlorite, with a view to securing an effluent that would compare favorably, from a bacteriological standpoint, with a sand filter effluent, in order to avoid the expense of constructing the sand filters recommended in the report of the Advisory Engineers. It was estimated by the Advisory Engineers that these sand

TABLE G.

SUMMARY OF RELATIVE STABILITY NUMBERS.

Incubation at 20° C.

PERIOD COVERED.	6 Foot Beds				9 Foot Beds				12 Foot Beds			
	Size of Stone				Size of Stone				Size of Stone			
	½ to 1½ Inches	1 to 2 Inches	2 to 4 Inches	4 to 6 Inches	½ to 1½ Inches	1 to 2 Inches	2 to 4 Inches	4 to 6 Inches	½ to 1½ Inches	1 to 2 Inches	2 to 4 Inches	4 to 6 Inches
1907.												
Oct. 9 to Oct. 31	35	28	29	19	53	35	37	25	64	49	60	23
Nov. 1 to Nov. 30	66	48	51	28	77	84	60	48	85	72	81	51
Dec. 3 to Dec. 30	92	86	35	21	95	87	67	30	95	87	70	50
1908.												
Jan. 2 to Jan 31	74	57	64	24	84	81	86	40	95	91	90	49
Feb. 1 to Feb. 29	91	82	58	36	91	93	84	42	95	95	89	55
Mar. 2 to Mar. 31	85	82	48	25	95	95	90	32	95	95	91	47
April 1 to May 8	81	86	36	20	93	95	90	27	95	95	91	35

12 Foot Bed, ½ Inch to 1½ Inch Stone, treated with bleach after January 1.

TABLE G.—*Continued.*

SUMMARY OF RELATIVE STABILITY NUMBERS:

Incubation at 20° C.

PERIOD COVERED. 1908.	4½ Foot Beds				7½ Foot Beds				10½ Foot Beds			
	1″ to 2″ Stone		1″ to 3″ Stone		1″ to 2″ Stone		1″ to 3″ Stone		½″ to 1½″ Stone		1″ to 2″ Stone	
	Filtered Effluent	Settled Effluent	Filtered Effluent	Settled Effluent	Filtered Effluent	Settled Effluent	Filtered Effluent	Settled Effluent	Filtered Effluent	Settled Effluent	Filtered Effluent	Settled Effluent
June 5 to June 30	73	82	42	77	95	95	57	83	95	95	95	95
July 1 to Aug. 14	60	70	31	70	95	95	80	81	95	95	95	95
	Correction for residual chlorine applied after August 14.											
Aug. 17 to Sept. 4	65	87	54	84	95	95	85	95	95	95	95	95
Oct. 6 to Nov. 12	24	31	25	79	61	60	34	66	95	92	95	95

4½ Foot and 7½ Foot Beds, 1 Inch to 3 Inch Stone and 10½ Foot Bed, ½ Inch to 1½ Inch Stone, treated with bleach.

TABLE G.—*Concluded.*

SUMMARY OF RELATIVE STABILITY NUMBERS.

Incubation at 20° C.

Period Covered. 1908.	6 Foot Beds				9 Foot Beds				12 Foot Beds			
	1″ to 3″ Stone		2″ to 4″ Stone		1″ to 3″ Stone		2″ to 4″ Stone		2″ to 4″ Stone		4″ to 6″ Stone	
	Filtered Effluent	Settled Effluent	Filtered Effluent	Settled Effluent	Filtered Effluent	Settled Effluent	Filtered Effluent	Settled Effluent	Filtered Effluent	Settled Effluent	Filtered Effluent	Settled Effluent
July 14 to Aug. 6	73	88	56	62	84	95	78	86	95	95	68	77
	Correction for residual chlorine applied after August 6.											
Sept. 8 to Oct. 2	71	93	49	65	95	95	92	93	95	95	78	93

6 Foot and 9 Foot Beds, 1 Inch to 3 Inch Stone, treated with bleach.

filters would cost over $1,000,000 and would cost $60,000 a year to maintain and operate.

Professor Earle B. Phelps, who had already carried on a number of experiments in this line of work, was called upon to assist in these investigations. Arrangements were made to disinfect the effluent from the sprinkling filter 12 feet in depth with filtering material of ½-inch to 1½-inch stone. The disinfecting solution was added to the sprinkling filter effluent as it left the filter, and this effluent, after flowing through approximately 15 feet of 4-inch pipe, was then discharged into a settling basin giving a detention of approximately an hour and a half. This time, however, varied with the quantity of sewage which was being treated on the filters. Samples were taken of this effluent before the hypochlorite was added and after having passed through the settling basin.

The bacteriological methods used in studying these effluents have already been described. In general, these methods were those recommended by the Committee on Standard Methods of Analysis of the American Public Health Association. In the presumptive test for B. Coli the lactose-bile method described by Jackson was used. For the purpose of comparison, the Standard lactose-broth medium was also used for this test. In connection with the treatment of the effluent of this bed, the results of the individual analyses are shown in Appendix 3 and a resume of the results are shown in Tables H and K.

The results secured from the treatment of the effluent from this bed were so satisfactory that it was decided that further experiments should be made upon the effluents which were not so completely purified as was the case with the effluent from this deep bed of fine stone. After the changes already described were made in the filters, the effluents from the beds

TABLE H.

DISINFECTION OF SPRINKLING FILTER EFFLUENTS.

Twelve-Foot Bea, ½-inch to 1½-inch Stone.

Period Covered. 1907-1908.	Parts per Million.		Bacteria per C. C.						B. Coli per C. C.				Tempature of Effluent C.°	Relative Stability
	Available Chlorine.	Residual Chlorine.	Gelatine.		Agar.		Acid Formers.		Bile.		Broth.			
			Initial.	Final.	Initial.	Final.	Initial.	Final.	Initial.	Final.	Initial.	Final.		
Dec. 26 to Dec. 30.....	4.4	+	170,000	13,000	83,000	650	5,500	38	2,600	65	....	....	10.5	95
Jan. 2 to Jan. 8......	2.0	+	120,000	59,000	26,000	275	6,600	85	2,900	170	....	....	8.0	95
Jan. 9 to Jan. 15......	1.8	+	120,000	5,500	4,400	325	3,000	80	1,500	375	....	....	8.4	95
Jan. 16 to Jan. 22......	2.2	+	140,000	2,700	1,500	95	1,000	5	2,300	60	....	....	9.0	95
Jan. 23 to Jan. 29......	2.1	+	110,000	2,800	2,400	95	1,100	8	1,600	170	....	....	5.5	95
Jan. 30 to Feb. 5.......	2.5	0.52	92,000	5,200	1,100	75	450	2	550	190	....	....	6.0	95
Feb. 6 to Feb. 12......	2.1	0.83	66,000	9,200	1,000	170	350	9	425	325	....	....	6.6	95
Feb. 13 to Feb. 19......	1.0	0.14	96,000	22,500	5,200	750	3,800	300	550	225	....	....	8.0	95
Feb. 20 to Feb. 26......	1.7	0.51	72,000	5,400	3,300	100	1,400	23	1,400	45	3,300	55	7.1	95
Feb. 27 to March 4.....	1.7	0.41	100,000	1,900	1,400	65	700	4	2,300	230	400	200	7.4	95
March 5 to March 11..	1.9	0.51	87,000	1,800	1,400	90	900	3	1,500	150	3,500	210	7.9	95
March 12 to March 18..	1.8	0.38	83,000	1,000	1,000	60	475	6	2,100	180	1,900	270	9.1	95
March 19 to March 25..	2.0	0.36	150,000	1,600	1,100	85	750	10	600	140	700	400	9.6	95
March 26 to April 1....	1.9	0.26	140,000	2,100	5,200	150	2,800	12	2,200	200	3,000	300	11.4	95
April 2 to April 8....	2.3	0.73	160,000	1,100	1,100	60	425	1	1,400	130	3,200	130	11.0	95
April 9 to April 15....	2.4	0.89	150,000	1,400	4,300	75	3,100	3	1,500	34	3,600	160	12.3	95
April 16 to April 22....	2.4	0.49	130,000	2,700	1,500	400	9,800	150	5,400	43	3,300	425	13.0	95
April 23 to April 29....	3.0	0.64	130,000	1,600	2,900	110	2,200	2	1,700	150	3,600	170	14.5	95
April 30 to May 7.....	2.5	1.15	150 000	1,800	3,100	90	1,800	6	1,300	120	2,100	40	13.5	95

of 1-inch to 3-inch stone of 4½, 6, 7½ and 9 feet depths, and from the bed of ½-inch to 1½-inch stone of 10½ feet depth, were treated with the disinfectant. The character of these effluents is shown in Appendix 1, and the results obtained are shown in the tables of Appendix 3. A resume of these results is shown in Tables I, J and L, together with the relative stability numbers of the disinfected effluents. A study of these tables clearly shows that the poorer effluents from the shallower beds require much larger quantities of hypochlorite in order to secure a removal of bacteria approximating the results secured by using a comparatively small amount of hypochlorite with the more highly purified effluents from beds of greater depth.

As a result of these disinfection experiments it was decided that an effluent could be obtained from the sprinkling filters at the main Disposal Plant which, by subsequent treatment with calcium hypochlorite, would compare favorably with the effluents which could be secured by treatment in supplementary sand filters. Although individual results were secured which showed a high percentage removal of bacteria with quantities of available chlorine varying from one to two parts per million, yet these high percentage removals were not constant and the conclusions reached were that it would be necessary to use at least three parts of available chlorine per million gallons in treating the sprinkling filter effluents from the main Disposal Plant, should such treatment be deemed necessary.

The plant required for this treatment would cost but a few thousand dollars, compared with the million-dollar cost of the supplementary sand filters, while the annual cost of treating the sprinkling filter effluent with three parts per million of available chlorine would not be much more than half the cost of maintaining and operating the sand filters.

Above Report written
by E.B.W.

TABLE I.

DISINFECTION OF SPRINKLING FILTER EFFLUENTS.

Six-Foot Bed, 1-inch to 3-inch Stone.

PERIOD COVERED. 1908.	Parts per Million.		Bacteria per C. C.						B. Coli per C. C.		Tempature of Effluent C.°.	Relative Stability Number.
	Available Chlorine.	Residual Chlorine.	Gelatine.		Agar.		Acid Formers.		Bile.			
			Initial.	Final.	Initial.	Final.	Initial.	Final.	Initial.	Final.		
July 13 to July 18......	1.0	0.01	320,000	120,000	140,000	9,100	83,000	3,200	5,500	300	21.5	81
July 20 to July 25......	1.4	0.00	590,000	75,000	47,000	1,700	32,500	700	3,300	325	22.4	95
July 27 to August 1....	1.1	0.05	500,000	47,000	81,000	11,000	10,000	1,600	2,800	650	22.3	88
August 3 to August 8..	1.3	0.05	470,000	83,000	21,000	3,800	13,000	700	4,600	250	23.1	95
Sept. 8 to Sept. 14.....	2.3	0.20	400,000	40,500	66,000	4,000	33,000	1,100	7,000	375	20.3	95
Sept. 15 to Sept. 21....	2.6	0.20	460,000	96,000	100,000	18,500	53,000	8,900	30,000	2,800	18.3	87
Sept. 22 to Sept. 28....	4.0	1.50	650,000	14,500	46,000	700	25,000	30	7,800	33	20.2	95
Sept. 29 to October 3..	2.6	0.90	390,000	36,000	73,000	7,000	26,000	325	2,800	55	17.5	95

TABLE I.—*Concluded.*

DISINFECTION OF SPRINKLING FILTER EFFLUENTS.

Nine-Foot Bed, 1-inch to 3-inch Stone.

PERIOD COVERED. 1908.	Parts per Million.		Bacteria per C. C.						B. Coli per C. C.		Tempature of Effluent C.°.	Relative Stability Number.
	Available Chlorine.	Residual Chlorine.	Gelatine.		Agar.		Acid Formers.		Bile.			
			Initial.	Final.	Initial.	Final.	Initial.	Final.	Initial.	Final.		
July 13 to July 18......	1.2	0.07	230,000	84,000	62,000	10,000	21,000	6,200	5,500	80	21.3	95
July 20 to July 25......	1.7	0.02	750,000	21,500	21,000	780	12,000	20	3,300	275	22.5	95
July 27 to August 1....	1.4	0.13	420,000	48,500	56,000	6,800	3,100	38	650	65	22.3	95
August 3 to August 8..	1.6	0.32	320,000	52,000	18,000	1,600	2,700	190	650	250	22.7	95
Sept. 8 to Sept. 14.....	1.4	0.00	330,000	31,000	42,500	3,800	18,500	1,000	7,000	3,400	19.9	95
Sept. 15 to Sept. 21....	1.5	0.01	230,000	37,500	55,000	1,500	28,500	500	3,000	300	18.3	95
Sept. 22 to Sept. 28....	2.4	0.36	300,000	22,000	17,000	2,100	8,600	220	5,500	300	20.3	95
Sept. 29 to October 3..	1.8	0.32	240,000	33,000	62,000	4,700	16,000	450	26,000	320	17.2	95

TABLE J.

DISINFECTION OF SPRINKLING FILTER EFFLUENTS.

Ten and One-Half Foot Bed, ½-inch to 1½-inch Stone.

PERIOD COVERED. 1908.	Parts per Million.		Bacteria per C. C.						B. Coli per C. C.		Tempature of Effluent C.°	Relative Stability Number.
			Gelatine.		Agar.		Acid Formers.		Bile.			
	Available Chlorine.	Residual Chlorine.	Initial.	Final.	Initial.	Final.	Initial.	Final.	Initial.	Final.		
June 5 to June 11.....	2.2	0.34	120,000	34,500	25,500	5,000	10,500	1,100	650	80	18.8	95
June 12 to June 18.....	2.3	0.75	94,000	1,000	2,000	350	430	18	450	250	18.7	95
June 19 to June 25.....	1.9	0.19	160,000	3,100	3,100	800	500	0	800	275	21.3	95
June 26 to July 2.....	1.9	0.17	190,000	3,100	4,700	2,000	1,300	100	3,000	80	21.0	95
July 3 to July 11.....	2.0	0.11	240,000	6,500	9,100	1,100	4,700	170	2,600	550	21.1	95
Aug. 10 to Aug 16.....	2.1	0.68	220,000	65,000	12,500	2,400	6,600	10	800	65	23.5	95
Aug. 17 to Aug. 23.....	2.2	0.40	170,000	10,000	21,000	800	13,000	30	325	55	23.0	95
Aug. 24 to Aug. 30.....	1.9	0.29	360,000	2,700	26,000	1,800	5,500	9	2,600	65	20.5	95
Aug. 31 to Sept. 4.....	2.0	0.14	230,000	2,800	40,000	2,200	8.400	550	700	10	20.7	95
Oct. 5 to Oct. 11......	2.5	0.39	300,000	20,000	99,000	11,000	39,500	400	7,000	40	17.5	95
Oct. 12 to Oct. 18......	2.7	0.22	400,000	40,000	100,000	8,100	45,000	325	28,000	35	17.1	95
Oct. 19 to Oct. 25......	2.7	0.42	250,000	40,500	37,500	3,800	21,000	210	4,400	250	17.2	95
Oct. 26 to Nov. 1.....	2.2	0.14	330,000	31,500	78,000	4,500	21,500	1,600	8,200	2,200	16.3	95
Nov. 2 to Nov. 8.....	2.3	0.14	240,000	58,000	200,000	15.000	41,500	1,200	4,000	350	14.5	95
Nov. 9 to Nov. 13.....	3.3	0.38	430,000	25,500	160,000	11,000	25,000	25	5,500	550	13.8	95

TABLE J.—*Continued.*

DISINFECTION OF SPRINKLING FILTER EFFLUENTS.

Seven and One-Half Foot Bed, 1-inch to 3-inch Stone.

PERIOD COVERED. 1908	Parts per Million.		Bacteria per C. C.						B. Coli per C. C.		Tempature of Effluent C.°	Relative Stability Number.
	Available Chlorine.	Residual Chlorine.	Gelatine.		Agar.		Acid Formers.		Bile.			
			Initial.	Final.	Initial.	Final.	Initial.	Final.	Initial.	Final.		
June 5 to June 11	1.5	0.01	650,000	5,500	92,000	14,500	62,000	9,100	28,000	450	18.8	85
June 12 to June 18	1.7	0.03	320,000	2,600	94,000	550	36,000	0	22,500	250	18.8	95
June 19 to June 25	1.4	0.00	300,000	23,500	32,500	1,800	16,000	65	3,300	80	21.5	75
June 26 to July 2	1.3	0.00	450,000	43,500	89,000	3,000	28,500	750	5,500	80	20.9	95
July 3 to July 11	1.4	0.01	490,000	44,000	59,000	1,600	16,500	500	3,700	1,700	21.1	95
Aug. 10 to Aug 16	1.7	0.28	450,000	57,000	14,500	4,400	8,900	30	4,600	240	23.3	95
Aug. 17 to Aug. 23	1.8	0.06	330,000	15,000	28,000	1,100	12,000	160	5,500	2,800	23.2	95
Aug. 24 to Aug. 30	1.9	0.15	360,000	5,700	46,000	2,100	15,500	375	4,600	2,800	20.4	95
Aug. 31 to Sept. 4	1.7	0.01	250,000	11,000	90,000	4,700	19,500	1,300	4,000	100	20.6	95
Oct. 5 to Oct. 11	1.4	0.00	800,000	180,000	200,000	13,500	110,000	5,500	7,000	700	17.5	95
Oct. 12 to Oct. 18	1.5	0.00	1,300,000	280,000	290,000	54,000	120,000	24,000	30,500	3,300	17.3	64
Oct. 19 to Oct. 25	1.5	0.00	1,200,000	420,000	270,000	49,000	130,000	31,000	42,000	4,400	17.4	52
Oct. 26 to Nov. 1	1.5	0.00	900,000	280,000	370,000	73,000	140,000	32,000	100,000	10,000	16.7	67
Nov. 2 to Nov. 8	2.0	0.00	470,000	170,000	310,000	250,000	84,000	57,000	7,000	4,000	14.5	44
Nov. 9 to Nov. 13	2.9	0.38	700,000	60,000	230,000	8,400	96,000	3,200	10,000	5,000	13.8	79

TABLE J.—*Concluded.*

DISINFECTION OF SPRINKLING FILTER EFFLUENTS.

Four and One-Half Foot Bed, 1-inch to 3-inch Stone.

PERIOD COVERED. 1908.	Parts per Million.		Bacteria per C. C.						B. Coli per C. C.		Tempature of Effluent C.°	Relative Stability Number.
	Available Chlorine.	Residual Chlorine.	Gelatine.		Agar.		Acid Formers.		Bile.			
			Initial.	Final.	Initial.	Final.	Initial.	Final.	Initial.	Final.		
June 5 to June 11.....	1.7	0.00	750,000	81,000	120,000	47,500	88,000	20,500	46,000	225	18.7	83
June 12 to June 18.....	1.7	0.03	260,000	24,000	60,000	750	29,000	90	22,500	250	18.8	82
June 19 to June 25.....	1.5	0.00	440,000	20,500	39,000	1,300	24,000	250	28,000	300	21.6	67
June 26 to July 2.....	1.4	0.00	460,000	77,000	81,000	4,000	44,000	2,500	3,300	325	20.9	68
July 3 to July 11.....	1.4	0.00	790,000	100,000	89,000	5,700	33,500	1,900	37,000	2,100	21.1	54
Aug. 10 to Aug 16.....	2.0	0.26	500,000	64,000	27,300	6,000	17,000	40	4,600	250	23.3	95
Aug. 17 to Aug. 23.....	3.4	0.69	600,000	5,400	93,000	2,200	46,500	10	2,800	300	22.9	95
Aug. 24 to Aug. 30.....	3.4	0.91	500,000	8,600	88,000	1,500	44,500	75	8,000	2,000	20.4	82
Aug. 31 to Sept. 4.....	3.5	0.52	370,000	7,400	210,000	1,100	77,000	300	4,000	375	20.7	74
Oct. 5 to Oct. 11......	3.2	0.12	1,100,000	170,000	290,000	7,300	110,000	2,000	10,000	375	17.8	82
Oct. 12 to Oct. 18......	3.5	0.16	1,300,000	160,000	280,000	9,000	140,000	1,000	30,500	550	17.3	79
Oct. 19 to Oct. 25......	3.6	0.24	1,500,000	94,000	360,000	25,000	170,000	3,400	61,000	275	17.4	78
Oct. 26 to Nov. 1.....	2.8	0.12	1,300,000	73,000	500,000	19,000	190,000	6,500	62,000	650	16.2	84
Nov. 2 to Nov. 8.....	3.0	0.10	700,000	120,000	330,000	110,000	120,000	9,600	4,000	350	14.5	79
Nov. 9 to Nov. 13.....	4.4	1.06	850,000	38,000	330,000	850	120,000	80	5,500	55	13.8	68

TABLE K.

DISINFECTION OF SPRINKLING FILTER EFFLUENTS.

Percentage Summary. Twelve-Foot Bed, ½-inch to 1½-inch Stone.

Period Covered. 1907-1908.	Parts per Million.		Percentage Bacterial Removal.					Relative Stability Number.
	Available Chlorine.	Residual Chlorine.	Gelatine.	Agar.	Acid Formers.	B. Coli.		
						Bile.	Broth.	
Dec. 26 to Dec. 30	4.4	+	92.4	99.22	99.31	97.50	....	95
Jan. 2 to Jan. 8	2.0	+	50.9	98.94	98.71	94.1	....	95
Jan. 9 to Jan. 15	1.8	+	95.42	92.7	97.34	75.0	....	95
Jan. 16 to Jan. 22	2.2	+	98.07	93.7	99.50	97.39	....	95
Jan. 23 to Jan. 29	2.1	+	97.46	96.04	99.27	89.4	....	95
Jan. 30 to Feb. 5	2.5	0.52	94.3	93.2	99.56	65.4	....	95
Feb. 6 to Feb. 12	2.1	0.83	86.1	83.0	97.43	23.5	....	95
Feb. 13 to Feb. 19	1.0	0.14	76.6	85.6	92.10	50.0	....	95
Feb. 20 to Feb. 26	1.7	0.51	92.5	96.97	98.36	96.79	98.33	95
Feb. 27 to March 4	1.7	0.41	98.10	95.36	99.43	90.0	50.0	95
March 5 to March 11	1.9	0.51	97.93	93.6	99.67	90.0	94.0	95
March 12 to March 18	1.8	0.38	98.80	94.0	98.75	91.0	85.5	95
March 19 to March 25	2.0	0.36	98.93	92.3	98.67	70.6	42.8	95
March 26 to April 1	1.9	0.26	98.50	97.2	99.57	90.1	90.0	95
April 2 to April 8	2.3	0.73	99.31	94.5	99.75	90.7	95.93	95
April 9 to April 15	2.4	0.89	99.07	98.26	99.90	97.74	95.55	95
April 16 to April 22	2.4	0.49	97.92	73.4	98.47	99.20	87.1	95
April 23 to April 29	3.0	0.64	98.77	96.21	99.91	91.2	95.28	95
April 30 to May 7	2.5	1.15	98.80	97.10	99.67	90.8	98.10	95

TABLE L.

DISINFECTION OF SPRINKLING FILTER EFFLUENTS.

Percentage Summary.

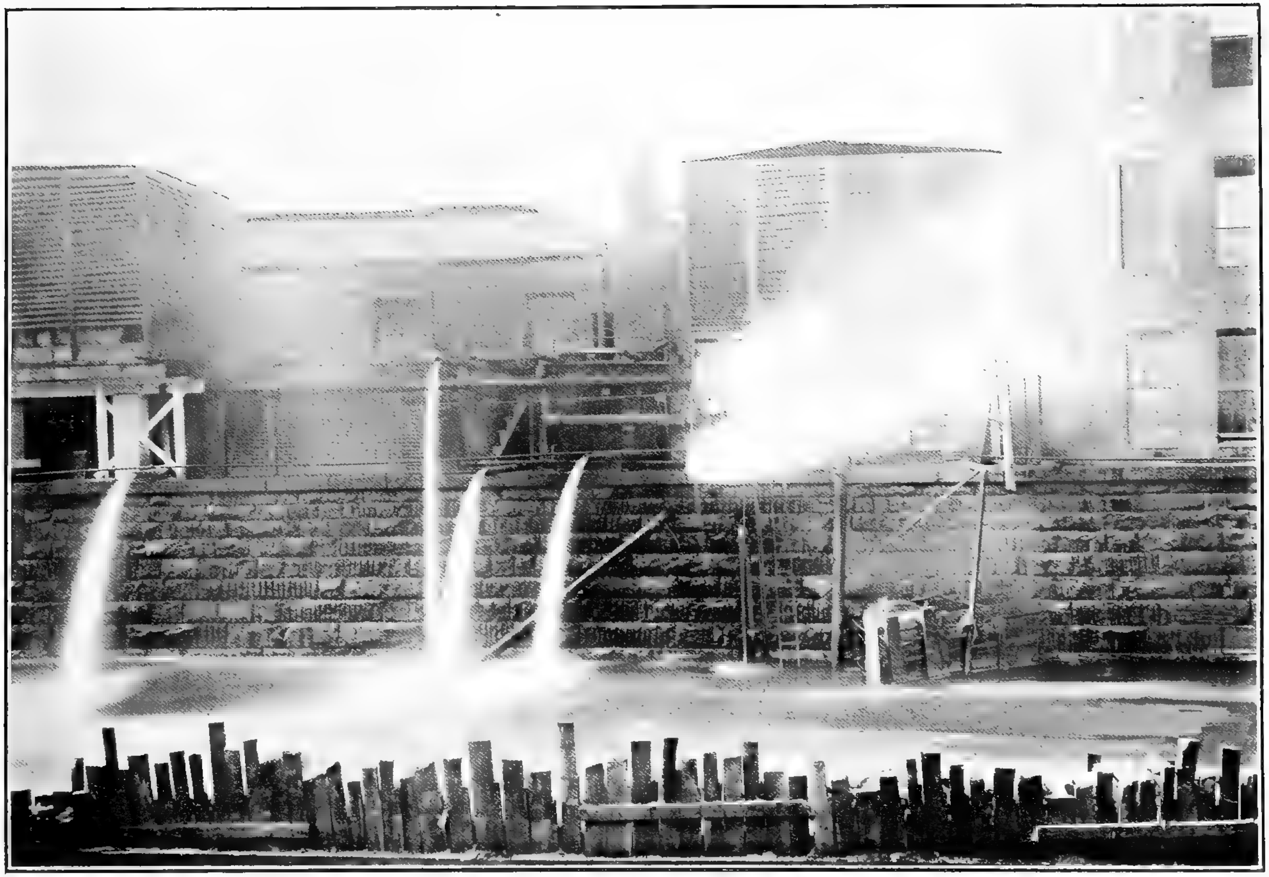
Period Covered. 1908.	Available Chlorine Parts per Million					Percentage Bacterial Removal.																	
	1"-3" Stone				1"-1½" Stone 10½' Bed	Gelatine.					Agar.					Acid Formers.					B. Coli-B		
	4½' Bed	6' Bed	7½' Bed	9' Bed		4½' Bed, 1"-3" Stone	6' Bed, 1"-3" Stone	7½' Bed, 1"-3" Stone	9' Bed, 1"-3" Stone	10½' Bed, ½"-1½" Stone	4½' Bed, 1"-3" Stone	6' Bed, 1"-3" Stone	7½' Bed, 1"-3" Stone	9' Bed, 1"-3" Stone	10½' Bed, ½"-1½" Stone	4½' Bed, 1"-3" Stone	6' Bed, 1"-3" Stone	7½' Bed, 1"-3" Stone	9' Bed, 1"-3" Stone	10½' Bed, ½"-1½" Stone	4½' Bed, 1"-3" Stone	6' Bed, 1"-3" Stone	7½' Bed 1"-3" Sto
June 5 to June 11	1.7	......	1.3	......	2.2	89.2	......	99.15	......	71.0	60.4	......	84.2	......	80.4	76.7	......	85.3	......	89.5	99.51	......	98.39
June 12 to June 18	1.2	......	1.2	......	2.3	99.8	......	99.19	......	98.94	99.87	......	90.41	......	82.5	99.69	......	100.00	......	95.81	98.89	......	98.89
June 19 to June 25	1.5	......	1.4	......	1.9	95.31	......	92.2	......	98.06	99.67	......	94.5	......	74.2	98.96	......	99.59	......	100.00	98.93	......	97.98
June 26 to July 2	1.4	......	1.3	......	1.9	83.3	......	90.3	......	98.37	95.96	......	96.63	......	57.4	94.3	......	97.32	......	92.3	99.1	......	98.55
July 3 to July 10	1.4	......	1.4	......	2.0	87.3	......	91.0	......	97.29	93.0	......	97.27	......	87.0	94.3	......	96.97	......	96.38	94.3	......	54.1
July 13 to July 18	......	1.6	......	1.2	......	......	63.5	......	63.5	......	......	93.5	......	83.9	......	......	96.14	......	70.5	......	......	94.54	......
July 20 to July 25	......	1.4	......	1.7	......	......	87.3	......	97.13	......	......	96.38	......	96.29	......	......	97.85	......	99.85	......	......	90.2	......
July 27 to Aug. 1	......	1.1	......	1.4	......	......	90.6	......	88.5	......	......	80.4	......	87.9	......	......	84.0	......	98.77	......	......	76.8	......
Aug. 3 to Aug. 8	......	1.3	......	1.6	......	......	82.4	......	89.8	......	......	81.9	......	91.1	......	......	94.6	......	93.0	......	......	94.6	......
Aug. 10 to Aug. 16	2.0	......	1.7	......	2.1	87.2	......	87.3	......	71.5	78.0	......	69.7	......	80.8	99.76	......	99.60	......	99.85	94.6	......	94.8
Aug. 17 to Aug. 23	3.4	......	1.8	......	2.2	99.10	......	95.45	......	94.1	97.63	......	96.07	......	96.10	99.98	......	98.67	......	99.77	89.3	......	49.1
Aug. 24 to Aug. 30	3.4	......	1.9	......	1.9	98.28	......	98.42	......	99.25	98.29	......	95.43	......	93.1	98.83	......	97.58	......	99.84	75.0	......	39.1
Aug. 31 to Sept. 4	3.5	......	1.7	......	2.0	98.00	......	95.60	......	98.78	99.48	......	94.8	......	94.5	99.61	......	93.3	......	93.4	90.6	......	97.5
Sept. 8 to Sept. 14	......	2.3	......	1.4	......	......	89.9	......	90.6	......	......	93.9	......	91.1	......	......	99.67	......	94.6	......	......	94.0	......
Sept. 15 to Sept. 21	......	2.6	......	1.5	......	......	79.2	......	83.7	......	......	81.5	......	97.27	......	......	83.2	......	98.25	......	......	50.7	......
Sept. 22 to Sept. 28	......	4.0	......	2.4	......	......	97.77	......	97.7	......	......	98.48	......	87.7	......	......	99.88	......	97.44	......	......	99.38	......
Sept. 29 to Oct. 3	......	2.6	......	1.8	......	......	90.8	......	86.3	......	......	90.4	......	92.4	......	......	98.75	......	97.19	......	......	98.04	......
Oct. 5 to Oct. 11	3.2	......	1.4	......	2.5	84.6	......	77.5	......	98.3	97.48	......	99.7	......	88.0	98.10	......	95.00	......	98.09	96.25	......	90.0
Oct. 12 to Oct. 18	3.3	......	1.5	......	2.7	87.7	......	78.5	......	90.0	96.79	......	81.4	......	91.0	99.29	......	86.0	......	99.38	98.20	......	89.2
Oct. 19 to Oct. 25	3.6	......	1.5	......	2.7	93.7	......	65.0	......	83.8	93.1	......	81.8	......	80.0	98.00	......	76.1	......	99.60	99.54	......	89.5
Oct. 26 to Nov. 1	2.8	......	1.5	......	2.2	94.4	......	68.9	......	90.5	96.20	......	80.3	......	94.2	96.48	......	77.2	......	99.6	98.95	......	90.0
Nov. 2 to Nov. 8	3.0	......	2.0	......	2.3	82.9	......	64.8	......	75.8	67.0	......	22.3	......	92.5	92.6	......	32.1	......	97.11	91.3	......	42.8
Nov. 9 to Nov. 15	4.1	......	2.9	......	3.3	95.53	......	91.4	......	94.1	99.74	......	96.35	......	93.1	99.93	......	96.66	......	99.99	99.00	......	50.0

TABLE L.

DISINFECTION OF SPRINKLING FILTER EFFLUENTS.

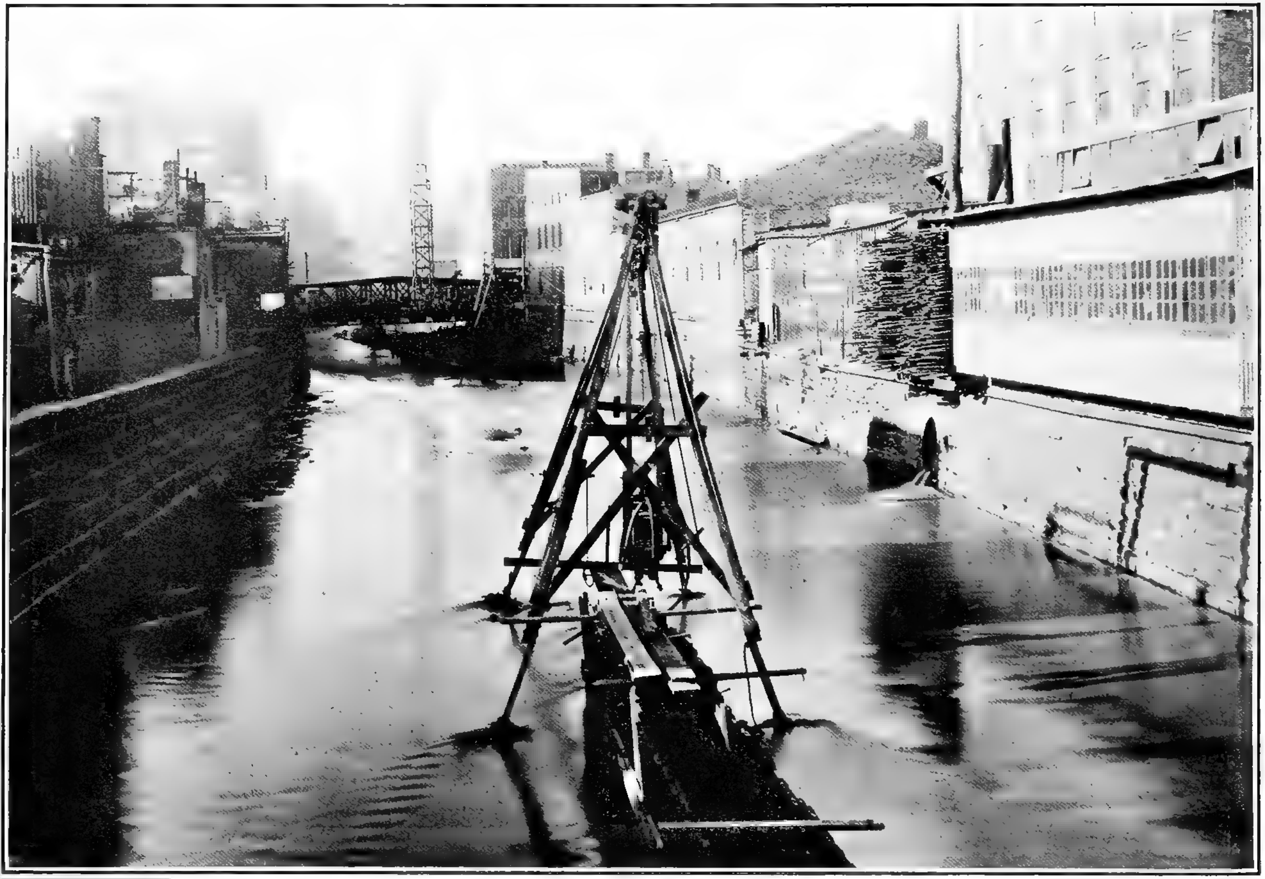
Percentage Bacterial Removal.

Gelatine.					Agar.					Acid Formers.					B. Coli-Bile.				
4½′ Bed, 1″-3″ Stone	6′ Bed, 1″-3″ Stone	7½′ Bed, 1″-3″ Stone	9′ Bed, 1″-3″ Stone	10½′ Bed, ¾″-1½″ Stone	4½′ Bed, 1″-3″ Stone	6′ Bed, 1″-3″ Stone	7½′ Bed, 1″-3″ Stone	9′ Bed, 1″-3″ Stone	10½′ Bed, ¾″-1½″ Stone	4½′ Bed, 1″-3″ Stone	6′ Bed, 1″-3″ Stone	7½′ Bed, 1″-3″ Stone	9′ Bed, 1″-3″ Stone	10½′ Bed, ¾″-1½″ Stone	4½′ Bed, 1″-3″ Stone	6′ Bed, 1″-3″ Stone	7½′ Bed, 1″-3″ Stone	9′ Bed, 1″-3″ Stone	10½′ Bed, ¾″-1½″ Stone
89.2		99.15		71.2	60.4		84.2		80.4	76.7		85.3		89.5	99.51		98.39		87.7
90.8		99.10		98.94	99.87		99.41		82.5	99.69		100.00		95.81	98.89		98.89		44.4
95.34		92.2		98.06	99.67		94.5		74.2	98.96		99.59		100.00	98.93		97.58		65.6
83.3		90.3		98.37	95.06		96.63		57.4	94.3		97.32		92.3	90.3		98.55		97.34
87.3		91.0		97.29	93.6		97.29		87.9	94.3		96.97		96.38	94.3		54.1		78.8
	62.5		69.5			93.5		83.9			96.14		70.5			94.34		98.55	
	87.3		97.13			98.38		96.29			97.85		99.83			90.2		91.7	
	90.6		88.5			86.4		87.9			84.0		98.77			76.8		90.0	
	82.4		83.8			81.9		91.1			94.6		93.0			94.6		61.5	
87.2		87.3		79.5	78.0		69.7		80.8	99.76		99.66		99.85	94.6		94.8		91.9
99.10		95.45		94.1	97.63		96.07		96.19	99.98		98.67		99.77	89.3		49.8		83.1
98.28		98.42		99.25	98.29		95.43		93.1	98.83		97.58		99.84	75.0		39.1		97.5
98.00		95.60		98.78	90.48		94.8		94.5	99.61		93.3		93.4	99.6		97.5		98.37
	89.9		90.6			93.9		91.1			96.67		94.6			94.6		51.4	
	79.2		83.7			81.5		97.27			83.2		98.25			10.7		90.0	
	97.77		93.7			98.48		87.7			99.88		97.44			99.58		94.5	
	90.8		86.3			90.4		92.4			98.75		97.19			98.04		98.77	
84.6		77.5		93.3	97.48		90.7		88.9	98.10		95.00		98.99	96.25		90.0		99.43
87.7		78.5		90.0	96.79		81.4		91.9	99.29		80.0		99.28	98.20		89.2		99.88
93.7		65.0		83.8	93.1		81.8		89.9	98.00		76.1		99.00	99.54		89.5		94.3
94.4		68.9		98.5	96.20		80.3		94.2	96.58		77.2		92.6	98.95		90.0		73.2
82.9		63.8		75.8	67.9		22.3		92.5	92.0		12.1		97.11	91.3		42.8		91.2
95.53		91.4		94.1	99.74		96.35		93.1	99.93		99.66		99.99	90.00		50.0		90.0



JONES' FALLS CONDUITS, SECTION No. 1.

Looking West Across Jones' Falls, South of Hillen Street, Showing Plant of the Independent Ice Company and Number and Arrangement of Suction and Discharge Pipes.



JONES' FALLS CONDUITS, SECTION No. 1.

Looking North from Lexington Street, Showing Construction of the Cofferdam for the East Conduit. The Large Sewer Entering on the Right Is the Old Low Street Storm-water Drain.

The work at the Testing Station was carried on as a part of the work of the Disposal Division, and those responsible for the results above mentioned are:

Ezra B. Whitman, Division Engineer.
C. A. Emerson, Jr., Assistant Division Engineer.
H. C. McRae, Chemist.
Dr. E. G. Birge, Bacteriologist.
A. E. Falkenberg, Assistant Engineer.
G. J. Armeling, Assistant Chemist.
J. Bosley Thomas, Assistant Bacteriologist.
J. J. Neal, Inspector.

ACKNOWLEDGEMENTS.

Mr. George W. Fuller, of the firm of Hering & Fuller, made a number of valuable suggestions in carrying out the work of the Sewage Testing Station.

Professor Earle B. Phelps, of the Massachusetts Institute of Technology, in connection with his work with the United States Geological Survey, and later in the employ of the Sewerage Commission, was engaged to advise in connection with the studies of disinfection of sewage. Mr. Phelps was also of great assistance in carrying out the routine work of the laboratory—many valuable suggestions for this work having been given by him.

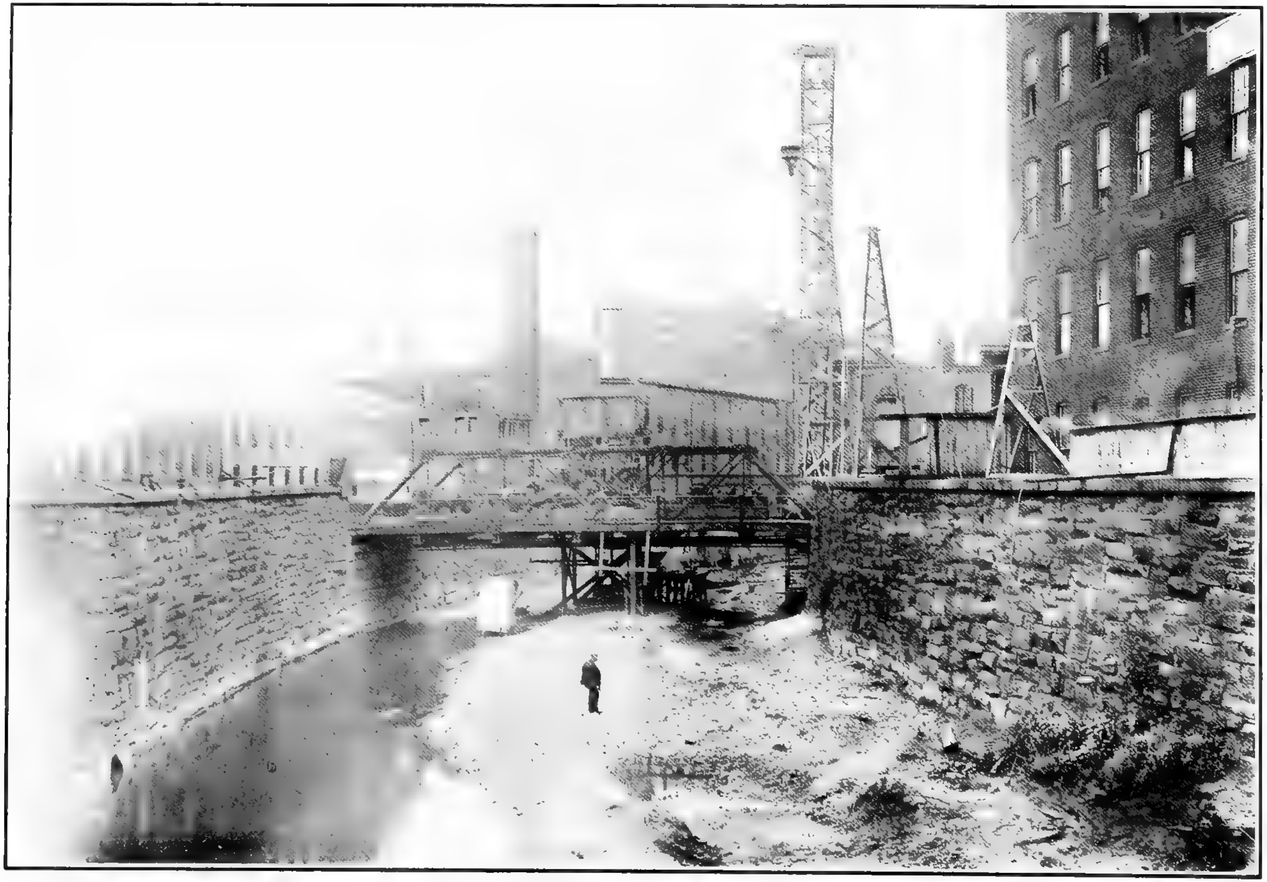
JONES FALLS IMPROVEMENT.

On beginning the study of the sewering and draining of the City, I was impressed with the possibility of incorporating Jones' Falls as a part of the storm-water drainage system, by enclosing it in reinforced concrete conduits and constructing a street on the redeemed strip of land. This is fully covered in my report to the Commission for 1906.

The elimination of this stream is second in importance to the sewering of the City. By dividing the construction into two sections, advertising extensively, and utilizing the stone from the tunnel on the second section to build the conduits for that section, we have been able to let these contracts for about $1,300,000, being less than my original estimate, as contained in my report to the Commission for 1906—viz., $1,600,000.

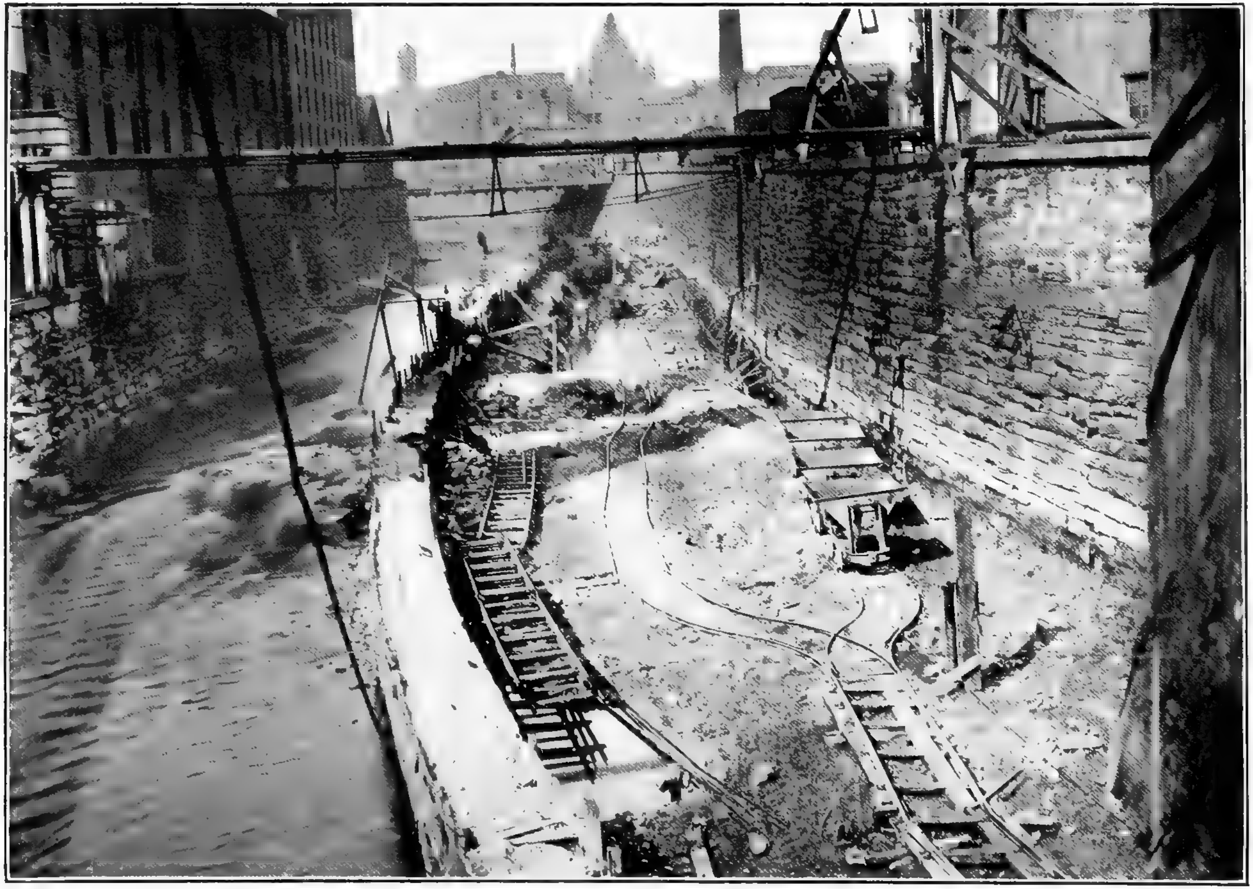
The contract for the construction of Section No. 1, extending from a point about 200 feet south of Baltimore Street to a point about 100 feet south of Centre Street, was let to M. M. Elkan, of Macon, Ga., and that for the construction of Section No. 2, extending from a point about 100 feet south of Centre Street to a point near Union Station, (amounting to over $700,000—the largest single contract ever let by the City), was let to Fisher & Carozza, of Baltimore. The work is progressing in a most satisfactory manner.

Unless one stops to consider the far-reaching effects of this improvement on the whole City, one cannot appreciate its value; among these effects are the improvement of the drainage conditions, the removal of the menace to health, the elimination of all bridges (together with the cost of their maintenance) and of all pipes crossing the Falls, the stopping of flooding, preventing the breeding of mosquitoes in stagnant pools in the summer, and the redemption of a strip of land 75 feet in width through the heart of the City, extending from the docks to the depots and containing approximately 12½ acres or about 544,000 square feet, on which a broad, smooth street will be built, transforming the present properties from abutting on an open sewer to facing on a broad roadway, and increasing the taxes sufficiently to pay the interest on the cost of the improvement and create a sinking fund to redeem the bond issue, also saving a large sum annually in the cost of trucking between the docks and the railroads by providing a smooth street on easy grades, on which one horse will

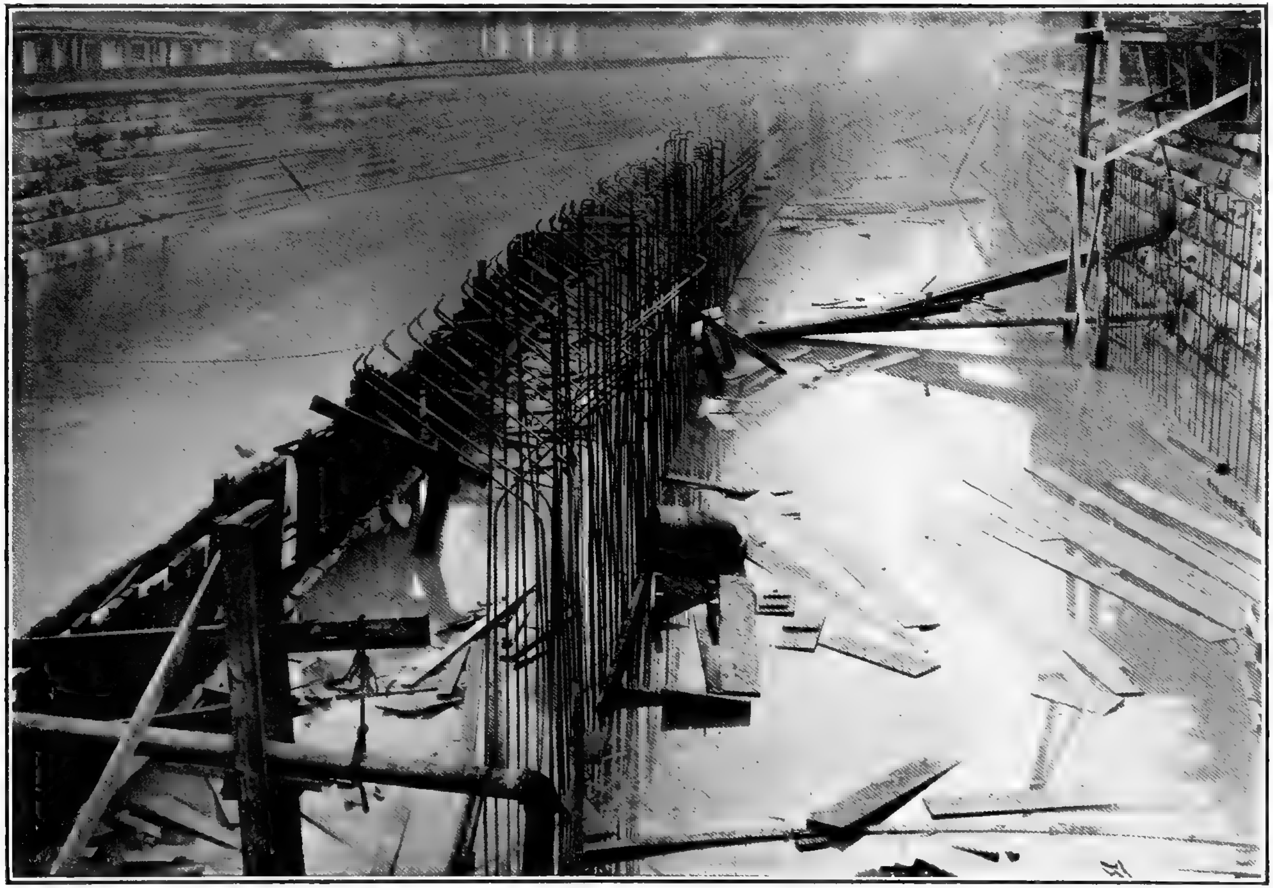


JONES' FALLS CONDUITS, SECTION No. 1.

Looking North Towards Bath Street Bridge, Showing Temporary Earth Cofferdam for East Conduit and Concrete Mixing and Excavating Plants Erected on the Bridge.



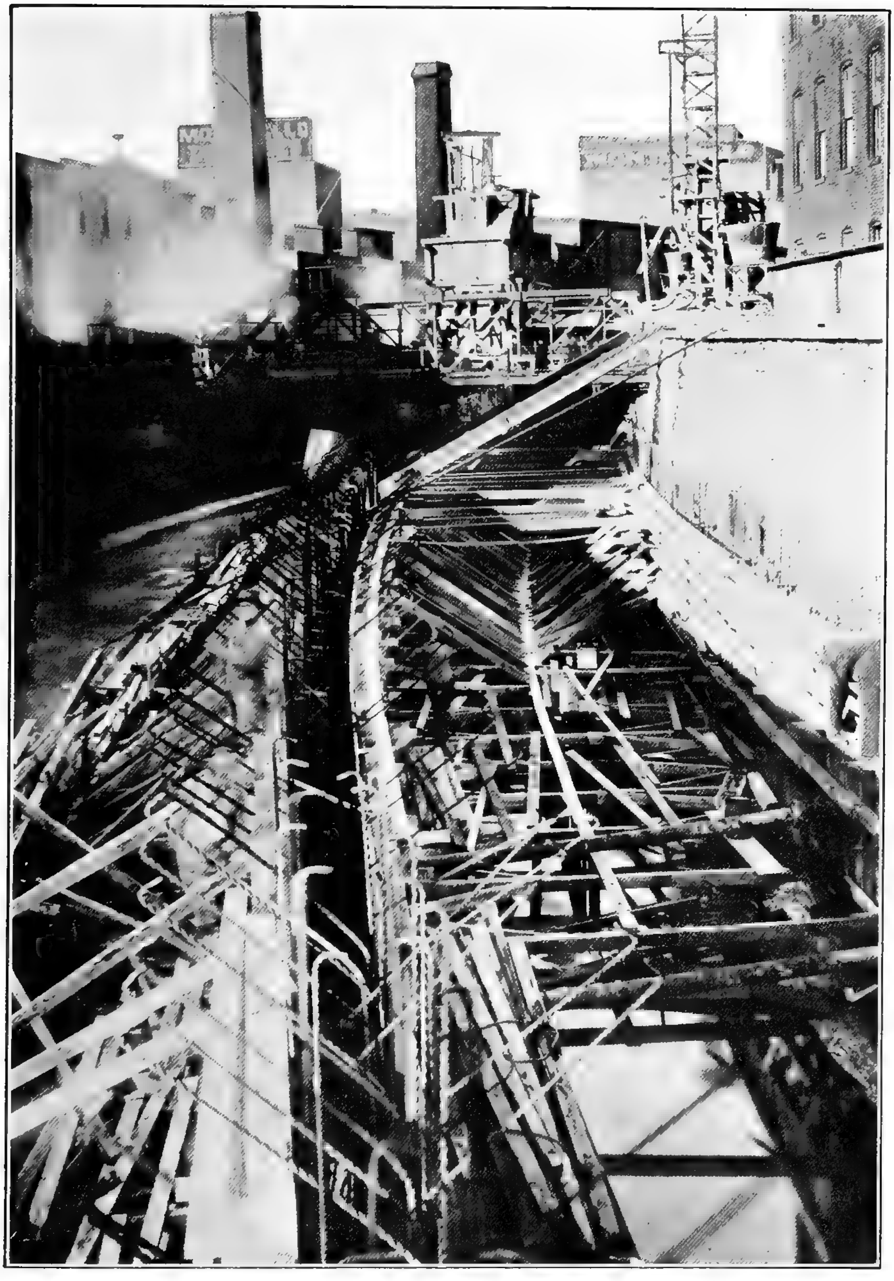
JONES' FALLS CONDUITS, SECTION No. 1.
Looking North from Bath Street, Showing Completed Cofferdam Between Bath and Centre Streets.



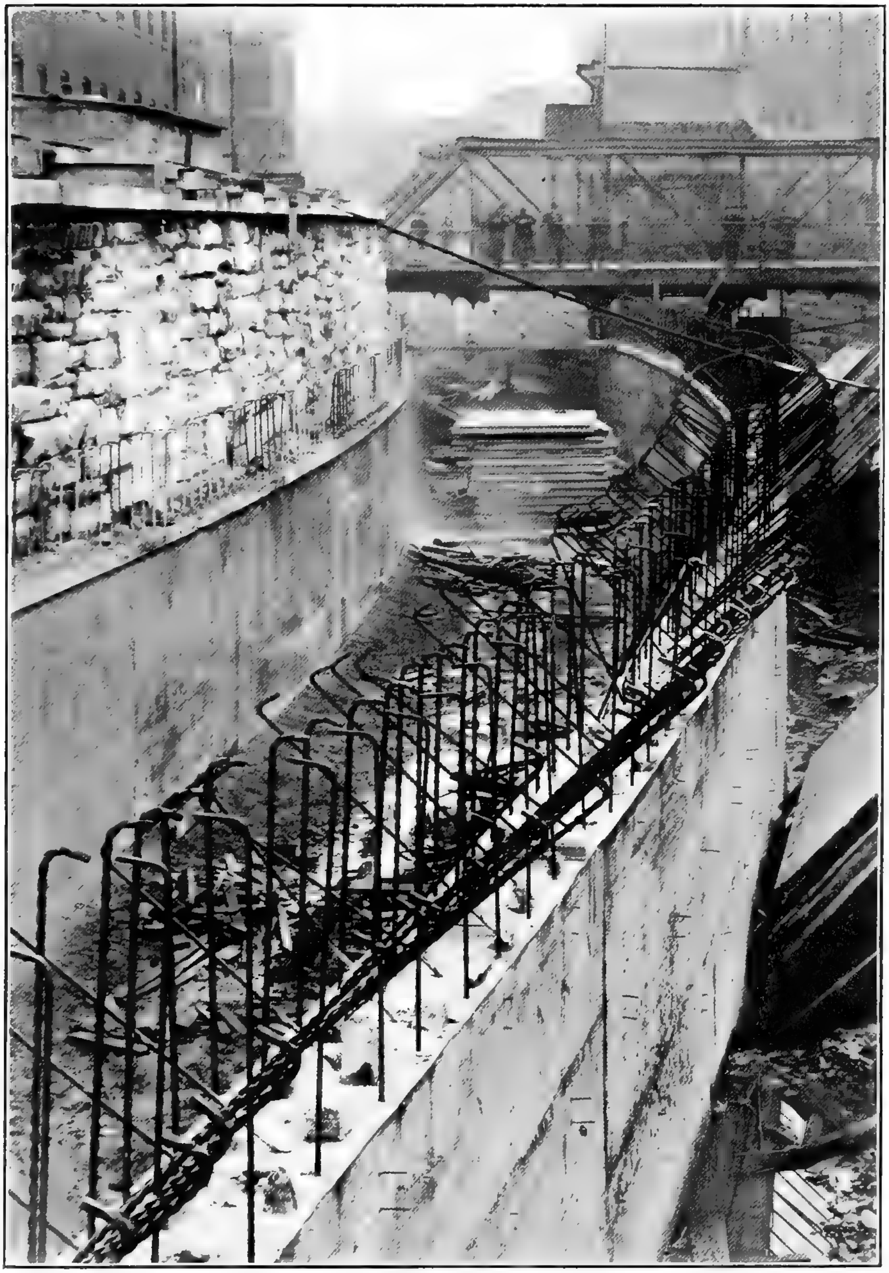
JONES' FALLS CONDUITS, SECTION No. 1.

Looking North from Gay Street, Showing Side Wall Reinforcement Before Forms Were Erected. Taken When the Work Was Flooded After a Heavy Rain.

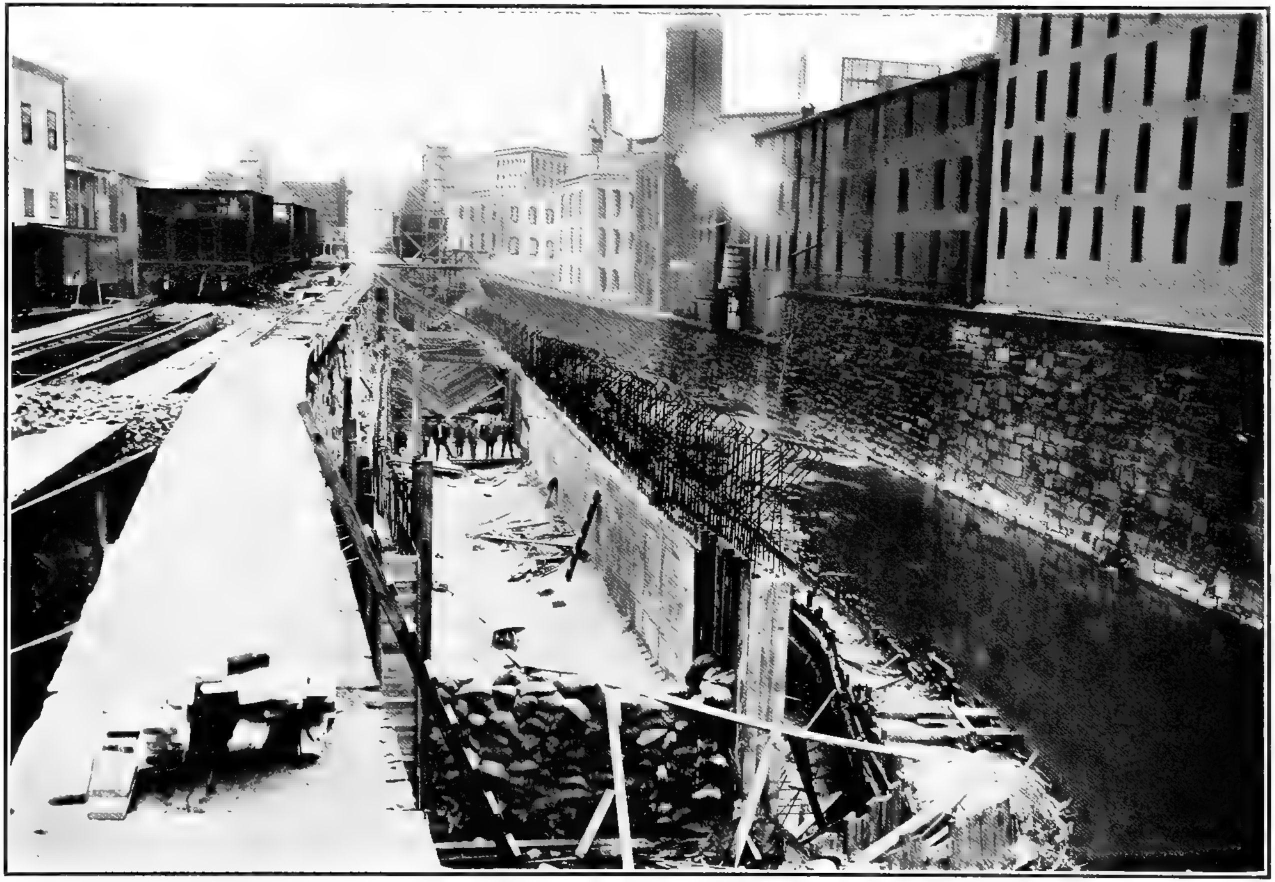
JONES' FALLS CONDUITS, SECTION No. 1.
Mayor James H. Preston, Chief Engineer Calvin W. Hendrick and Division Engineer Alfred H. Hartman Inspecting the Work.



JONES' FALLS CONDUITS, SECTION No. 1.
Looking North from Hillen Street, Showing Side Wall Forms and Reinforcement.
Concrete Mixing Plant in Background.

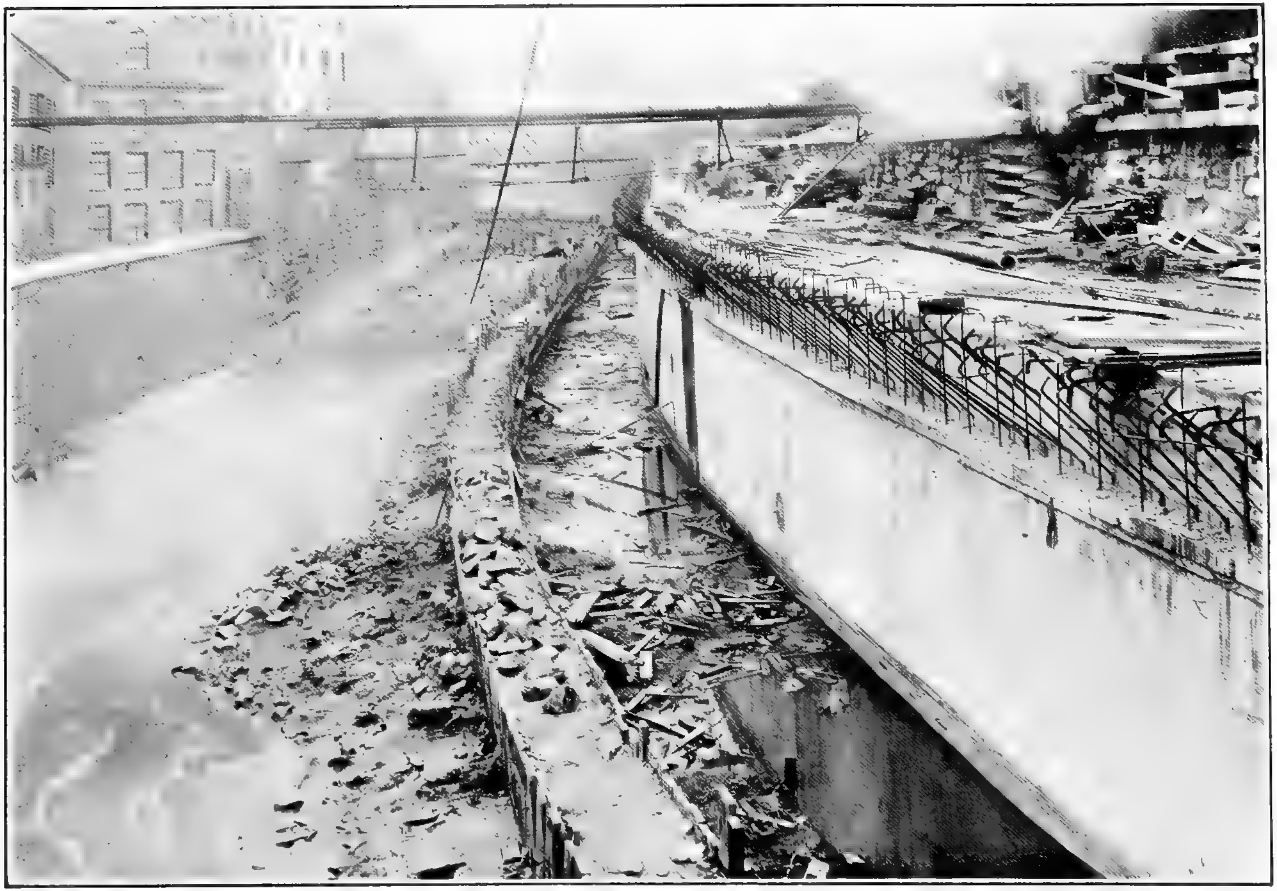


JONES' FALLS CONDUITS, SECTION No. 1.
Completed Side Walls, Ready for Top, Showing Arrangement of Reinforcement to Form Bond Between Roof-slabs of East and Centre Conduits.



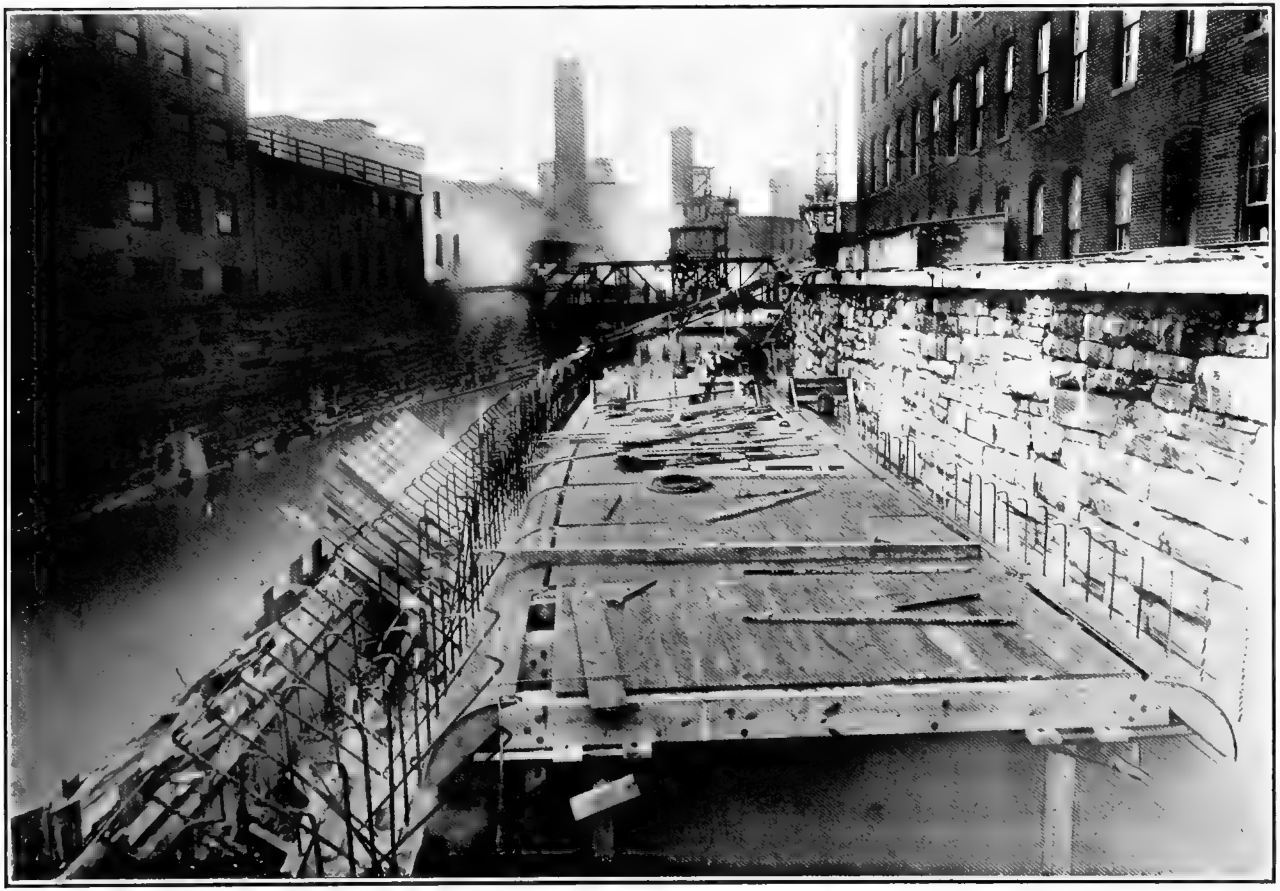
JONES' FALLS CONDUITS, SECTION No. 1.

End of Section No. 1, Showing Completed Side Walls Ready for Roof Construction. The Track on Top of the Retaining Wall on the Left Was Used for Concrete Dump Cars.

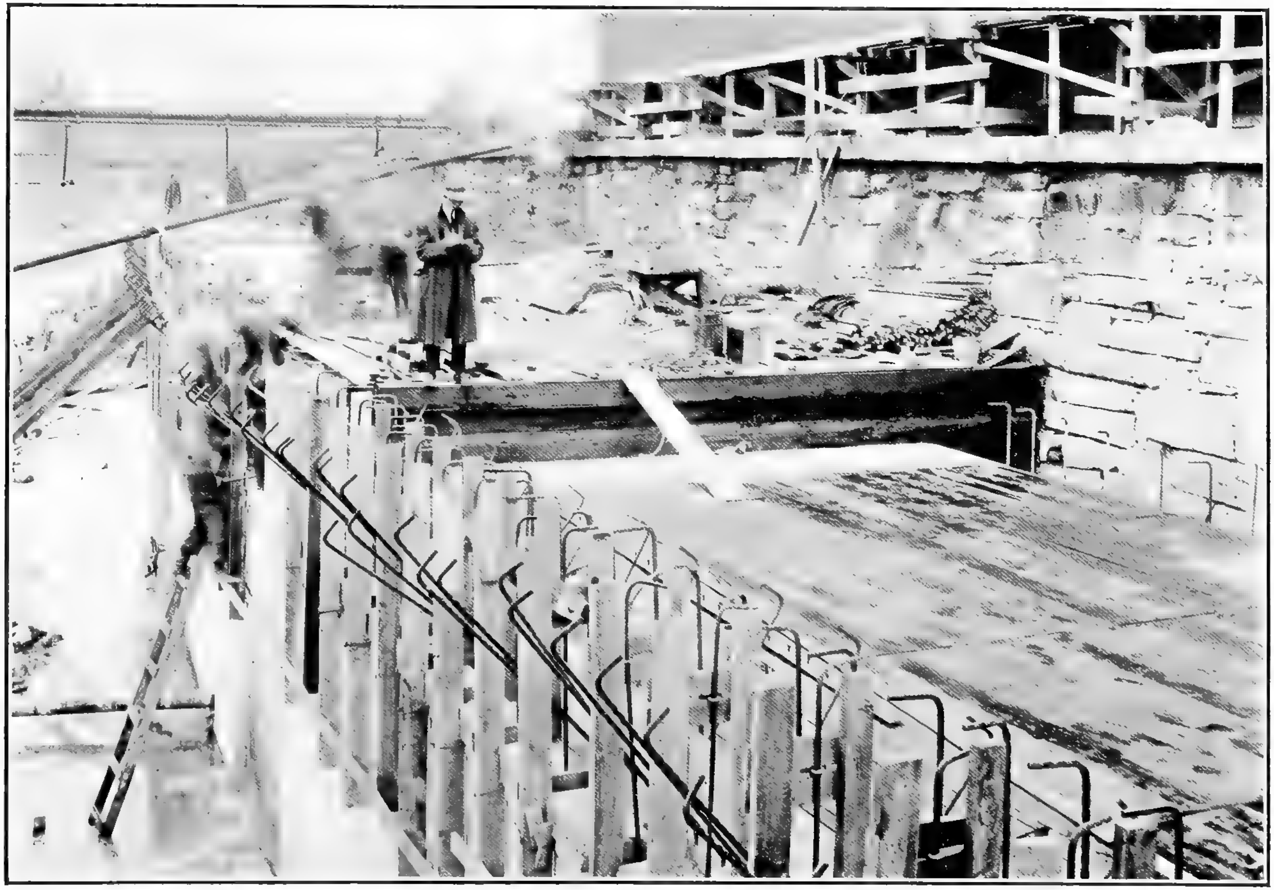


JONES' FALLS CONDUITS, SECTION No. 1.

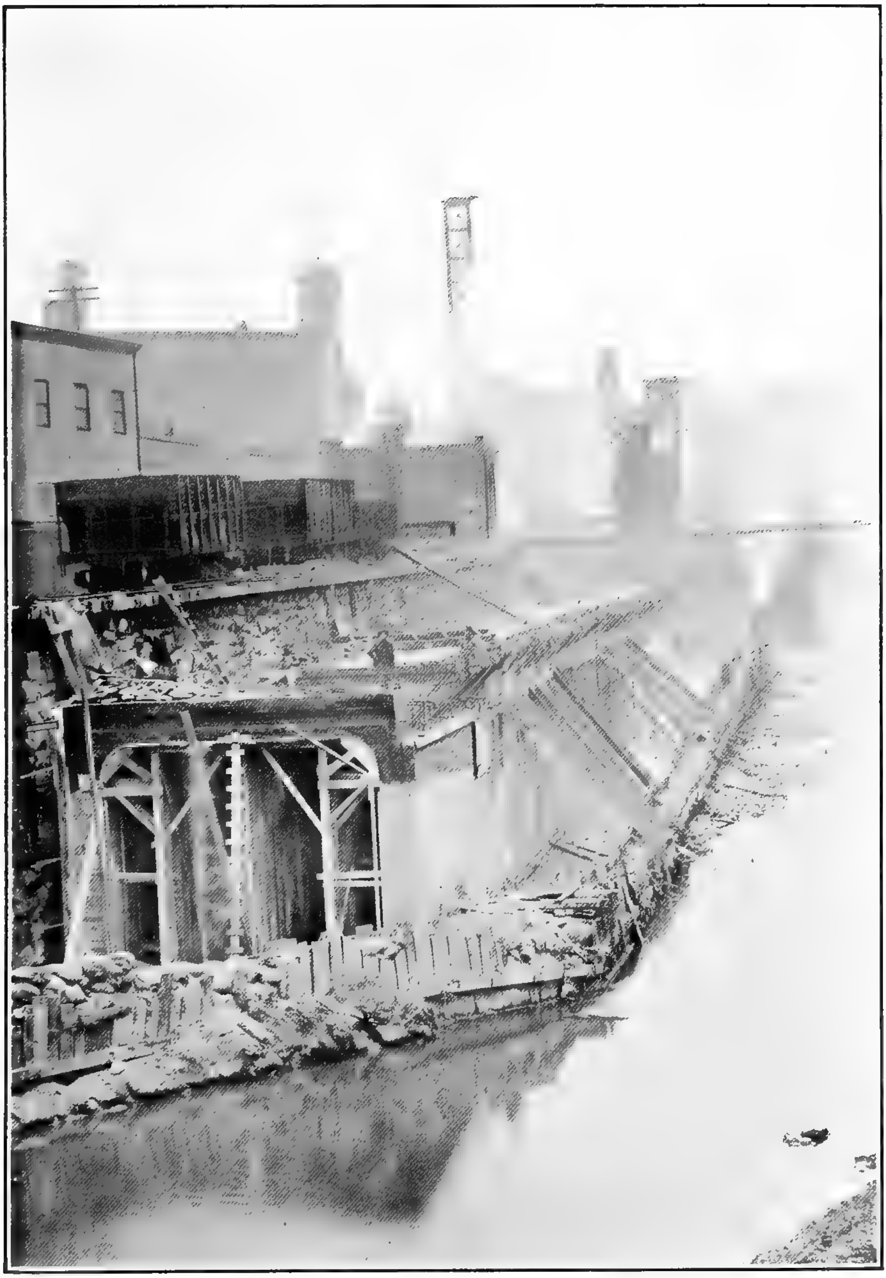
Looking North from Bath Street Bridge, Showing East Conduit Completed and Reinforcement Connecting East and Centre Conduits. The Flow of the Falls Has Been Diverted into the East Conduit. The Centre and West Conduits Will Occupy the Space Between the East Conduit and the Wall on the Left.



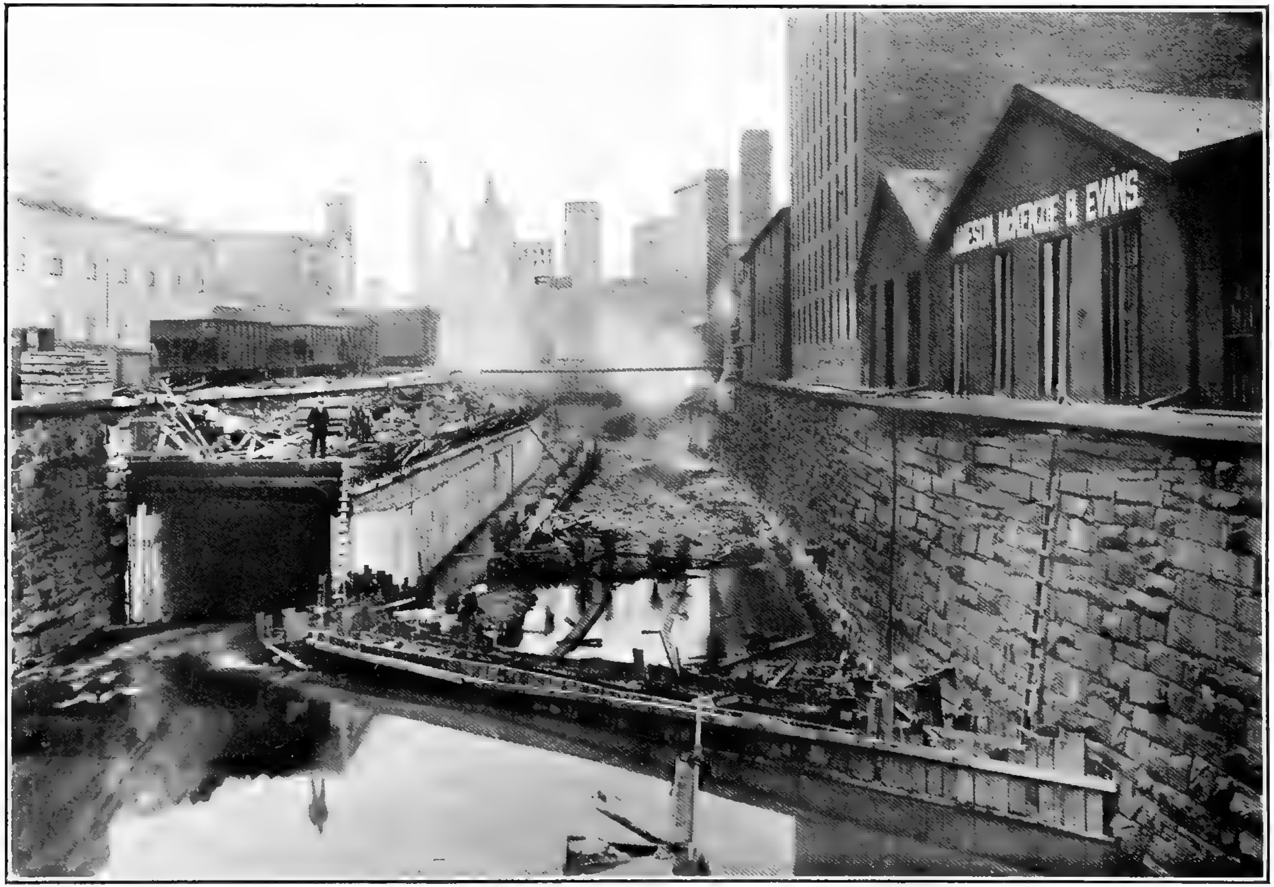
JONES' FALLS CONDUITS, SECTION No. 1.
Looking North from Hillen Street Bridge, Showing Roof Forms and Concreting in Progress on the East Conduit.



JONES' FALLS CONDUITS, SECTION No. 1.
Cross-section of Reinforced-concrete Roof-slab Over the East Conduit, Just North of Bath Street, Showing Forms and Side Wall Reinforcement.



JONES' FALLS CONDUITS, SECTION No. 1.
Up-stream End of Cofferdam and End of Completed Portion of East Conduit.



JONES' FALLS CONDUITS, SECTION No. 1.
Looking South from Centre Street Bridge, Showing Diverting Dam and Completed Section of the East Conduit. The Centre and West Conduits Will Occupy the Space Between the Conduit and the Wall on the Right.

be able to do work which now requires two. Other cities, at a cost of millions of dollars, are condemning land in order to secure new outlets for growing traffic, while in this case the City of Baltimore is redeeming useless land for this broad, new street as an incident to the making of a much-needed improvement in the drainage conditions. From a financial standpoint it will be a paying investment.

I find that the City has spent over $2,000,000 in building the present retaining walls, which did not eliminate any of the above-mentioned troubles, or redeem the land.

CONCLUSION.

One of our greatest difficulties has been to maintain the force at a high degree of efficiency. On account of our work attracting such wide attention, we are constantly losing men through better offers from widely scattered localities. The personnel of the force today is practically a new one.

I wish to take this opportunity of expressing my appreciation of the loyal assistance rendered me by the Division Engineers and their assistants, covering the various divisions of the work, viz.: Mr. Albert M. Brosius, First Assistant; Mr. Ezra B. Whitman, ex-Division Engineer of the Disposal Division; Mr. Thomas D. Pitts, Office Division, (especially with reference to the designing of the pumps); Mr. Alfred H. Hartman, of the Low Level and Storm-Water Divisions, and Mr. Oliver W. Connet, of the High Level Division.

The work continues to attract visitors from all sections of the world and is advertising the City extensively.

In order to make the report as comprehensible as possible to the layman, I have included a number of photographs and maps.

Respectfully submitted,

CALVIN W. HENDRICK,
Chief Engineer.

TABLES

TABLE No. 1.

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
Albert M. Brosius.....	First Assistant.........	Jan. 2, 1906.	
Ezra B. Whitman.....	Division Engineer......	Jan. 2, 1906.	Resigned October 1, 1911.
Oliver W. Connet......	Division Engineer......	Jan. 2, 1906.	
Thomas D. Pitts.......	Division Engineer......	June 4, 1906.	
Alfred H. Hartman....	Division Engineer	Jan. 15, 1906.	
A. F. Nagle..........	Mechanical Engineer...	May 13, 1907.	Resigned March 3, 1911.
F. H. Cronin...........	Mechanical Engineer...	May 9, 1911.	
J. Fletcher Apsey......	Asst. to Div. Engineer.	Jan. 15, 1906.	
W. A. Megraw.........	Asst. to Div. Engineer.	Dec. 3, 1906.	
H. C. McRae..........	Asst. to Div. Engineer.	Jan. 21, 1907.	
R. L. Burwell....	Asst. to Div. Engineer.	June 24, 1907.	
John J. Frederick.....	Secretary..............	Oct. 1, 1905.	
Levin J. Houston, Jr...	Asst. Engineer "A"....	Jan. 15, 1906.	
Raymond H. Williams..	Asst. Engineer "A"....	Mar. 1, 1906.	Resigned October 1, 1911.
Elliott H. Burwell.....	Asst. Engineer "A"....	Jan. 15, 1906.	
Covington K. Allen....	Asst. Engineer "A"....	June 1, 1907.	
Henry S. Shryock.....	Asst. Engineer "A"....	May 1, 1906.	
Arthur C. Toner......	Asst. Engineer "A"....	Jan. 15, 1906.	
August E. Falkenberg...	Asst. Engineer "A"....	Feb. 1, 1906.	Resigned October 1, 1911.
Thomas M. Ward......	Asst. Engineer "A"....	Nov. 16, 1911.	
Frank J. Parran.......	Asst. Engineer "A"....	May 28, 1907.	Promoted from Assistant Engineer "B" October 4, 1911.
Henry S. Regester......	Asst. Engineer "B"....	Jan. 15, 1906.	
Harry F. Schaefer.....	Asst. Engineer "B"....	June 20, 1907.	

TABLE No. 1—*Continued*.

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
John Moore, Jr.	Asst. Engineer "B"	May 16, 1907.	
Ralph Hutchins	Asst. Engineer "B"	Feb. 1, 1906.	
William L. Williams	Asst. Engineer "B"	June 27, 1907.	
J. H. Ensey	Asst. Engineer "B"	Nov. 29, 1911.	
F. W. Caspari	Asst. Engineer "B"	Feb. 1, 1906.	
Joseph H. Straus, Jr.	Asst. Engineer "B"	June 9, 1908.	Promoted from Draftsman "C" Jan. 1, 1911.
Robert Rumbold	Asst. Engineer "B"	Feb. 1, 1906.	Promoted from Rodman "A" Jan. 1, 1911.
J. Wightman Cleaveland	Asst. Engineer "B"	Dec. 24, 1906.	Promoted from Rodman "A" Oct. 4, 1911.
Gustav J. Requardt	Asst. Engineer "B"	June 23, 1909.	Promoted from Rodman "A" Oct. 4, 1911.
Edward F. Davis	Inspector "A"	Dec. 24, 1906.	
Charles S. York	Inspector "A"	Nov. 7, 1906.	
Frederick S. Jackson	Inspector "A"	July 2, 1907.	Resigned June 15, 1911.
John H. Sothoron	Inspector "A"	July 5, 1907.	
John J. Neal	Inspector "A"	Nov. 9, 1906.	
Milton J. Ruark	Inspector "A"	Jan. 22, 1906.	
John Martin	Inspector "A"	Mar. 3, 1910.	Resigned Sept. 1, 1911.
Charles I. Hammond	Inspector "B"	Nov. 7, 1906.	
Aulbin D. Tapscott	Inspector "B"	Nov. 19, 1906.	
William H. Bell	Inspector "B"	Dec. 19, 1906.	Resigned Nov. 15, 1910, reappointed Oct. 3, 1911.
George T. Robinson	Inspector "B"	June 1, 1907.	
Stephen A. Lusby	Inspector "B"	April 6, 1907.	
A. E. B. Jones	Inspector "B"	Jan. 15, 1906.	
Walter J. Caple	Inspector "B"	July 5, 1907.	Promoted from Inspector "C" May 15, 1911.

TABLE No. 1—*Continued.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
F. D. Christhilf	Inspector "B"	July 7, 1909.	Promoted from Inspector "C" Jan. 1, 1911.
Henry A. Albert	Inspector "C"	June 1, 1907.	
William A. Brogden	Inspector "C"	Nov. 7, 1906.	Resigned Nov. 15, 1910, reappointed Oct. 10, 1911.
John F. Garrett	Inspector "C"	Nov. 16, 1906.	
Horace A. Browne	Inspector "C"	July 5, 1907.	
Karl E. G. Kaufman	Inspector "C"	Jan. 15, 1906.	
Henry Kelly	Inspector "C"	July 17, 1907.	
Albert J. Boyle	Inspector "C"	Aug. 8, 1907.	Resigned June 13, 1911.
F. DeWolf Theobald	Inspector "C"	Aug. 9, 1907.	
J. Hamilton Davidson	Inspector "C"	Oct. 9, 1907.	
A. S. Bartholomaei	Inspector "C"	Oct. 9, 1907.	
John C. Strohm	Inspector "C"	Jan. 15, 1906.	
George E. Schaeffer	Inspector "C"	Aug. 11, 1908.	
William J. Boyle	Inspector "C"	Apr. 16, 1907.	
George B. Roberts	Inspector "C"	June 23, 1909.	Resigned April 15, 1911.
William Byrd	Inspector "C"	June 1, 1907.	
E. B. Richards	Inspector "C"	Jan. 15, 1906.	
J. H. Gambrell	Inspector "C"	Jan. 15, 1906.	
Martin W. Garrett	Inspector "C"	July 19, 1909.	
Lawrence H. Francis	Inspector "C"	Jan. 15, 1906.	
John Lynch	Inspector "C"	June 1, 1909.	
John A. Holthaus	Inspector "C"	Nov. 29, 1911.	
H. Howard Williams	Inspector "C"	Sept. 21, 1906.	Promoted from Rodman "A" Oct. 4, 1911.

TABLE No. 1—*Continued.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
J. Milton Knight	Inspector "C"	Aug. 4, 1908.	Promoted from Rodman "A" Oct. 4, 1911.
William F. Dolliver	Inspector "C"	July 7, 1909.	Promoted from Rodman "A" Oct. 4, 1911.
Harry G. Maynard	Inspector "C"	June 23, 1909.	Promoted from Rodman "A" Oct. 4, 1911.
John Daugherty	Inspector "C"	May 17, 1909.	Promoted from Rodman "B" Oct. 4, 1911.
Frank H. Firoved	Draftsman "A"	Jan. 23, 1906.	
J. Elmer Shepperd	Draftsman "A"	July 2, 1906.	
Claude A. Murphy	Draftsman "A"	Jan. 15, 1906.	
E. V. Hax	Draftsman "A"	Jan 15, 1906.	Promoted from Draftsman "B" May 15, 1911.
C. Boone Sadler	Draftsman "A"	Aug. 1, 1907.	Promoted from Draftsman "B" Jan. 1, 1911.
Maurice F. Rodgers	Draftsman "A"	Dec. 1, 1905.	Promoted from Record Clerk, Oct. 4, 1911.
George W. Townsend	Draftsman "B"	Nov. 18, 1907.	
Clarence G. Harig	Draftsman "B"	Apr. 20, 1908.	Promoted from Draftsman "C" Oct. 4, 1911.
David B. Stewart, Jr.	Draftsman "B"	Aug. 2, 1909.	Promoted from Rodman "A" July 1, 1911, resigned Aug. 18, 1911.
Harry J. Armstrong	Draftsman "C"	June 9, 1908.	Resigned Mar. 1, 1911.
Robert Dall, Jr.	Draftsman "C"	July 18, 1910.	
Thomas D. Conn	Draftsman "C"	Nov. 21, 1910.	
J. Lee Chapman	Draftsman "C"	Nov. 15, 1911.	
E. H. Brosius	Draftsman "C"	May 9, 1911.	
C. Karl Klaesius	Draftsman "C"	Mar. 1, 1911.	Resigned Aug. 8, 1911.
H. N. O'Brien	Draftsman "C"	Oct. 11, 1907.	Resigned Aug. 6, 1911, reappointed Nov. 15, 1911.
J. F. Diggs	Draftsman "C"	Oct. 3, 1911.	
C. Edgar Wood	Draftsman "C"	Oct. 3, 1911.	

TABLE No. 1—*Continued.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
William A. Twamley	Draftsman "C"	Dec. 4, 1911.	
Samuel Appleby	Draftsman "C"	Aug. 1, 1911.	
Dudley G. Frazer	Draftsman "C"	Aug. 1, 1911.	
Leslie C. Frank	Draftsman "C"	July 25, 1911.	
G. Herman Carl	Draftsman "C"	July 25, 1911.	
E. B. Gilmour	Draftsman "C"	June 12, 1911.	
C. F. Black	Draftsman "C"	June 12, 1911.	
F. E. Rasmers	Draftsman "C"	June 12, 1911.	Resigned Dec. 15, 1911.
William J. Frere, Jr.	Draftsman "C"	June 6, 1911.	
Herbert W. Chipchase	Draftsman "C"	Nov. 1, 1911.	
B. F. O'Connor, Jr.	Draftsman "C"	Oct. 17, 1911.	
D. W. Glass	Draftsman "C"	Dec. 26, 1911.	
George J. Armeling	Asst. Chemist	Aug. 8, 1907.	
H. R. Gundlach	Bacteriologist	Nov. 1, 1911.	
William Wagner	Rodman "A"	Jan. 15, 1906.	
R. Taylor Tunstall	Rodman "A"	Jan. 15, 1906.	
J. Carroll Daily	Rodman "A"	Feb. 1, 1906.	Resigned Aug. 1, 1911.
Isadore Behrman	Rodman "A"	July 22, 1910.	Transferred from Draftsman "C" Mar. 15, 1911.
L. Carroll Miller	Rodman "A"	Jan. 25, 1906.	
Wilford H. Herbert	Rodman "A"	July 16, 1906.	Promoted from Rodman "B" Oct. 4, 1911.
Thomas W. Sasscer	Rodman "A"	May 20, 1908.	Promoted from Rodman "B" Oct. 4, 1911.
Harry M. Webb	Rodman "A"	June 1, 1909.	Promoted from Rodman "B" Oct. 4, 1911.
Harry N. Brannan	Rodman "A"	Oct. 3, 1911.	

TABLE No. 1—*Concluded.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
J. S. Thompson, Jr.	Rodman "A"	Oct. 3, 1911	
Charles H. Brooks	Rodman "B"	Nov. 16, 1907.	
Conrad F. Kraeter	Rodman "B"	Sept. 20, 1906.	
Paul Wroth	Rodman "B"	May 19, 1908.	
H. W. Johenning	Rodman "B"	June 24, 1908.	
C. G. Walker	Rodman "B"	Dec. 1, 1911.	
John T. Merritt	Rodman "B"	Nov. 29, 1911.	
A. T. Hilton	Rodman "B"	Oct. 3, 1911.	
W. K. Potter	Rodman "B"	Oct. 3, 1911.	
W. H. Vickers	Rodman "B"	Oct. 17, 1911.	
C. J. Hellen	Rodman "B"	June 12, 1911.	Transferred from Draftsman "C" Nov. 8, 1911.
J. P. Joynes	Rodman "B"	June 12, 1911.	
William C. Briscoe	Rodman "B"	Nov. 16, 1909.	
Edgar C. Hasson	Stenographer	July 1, 1907.	Resigned Dec. 23, 1911.
G. Archer Hays	Stenographer	Sept. 3, 1907.	Resigned April 1, 1911.
Adam W. Gerlach	Stenographer	June 16, 1909.	
J. L. Pennington	Stenographer	July 23, 1909.	
Victor Klausmeyer	Stenographer	Dec. 5, 1910.	Resigned April 1, 1911.
F. W. Ensey	Stenographer	Apr. 11, 1911.	
W. L. Prout	Stenographer	Apr. 5, 1911.	
Henri H. Smith	Clerk	Aug. 18, 1910.	

TABLE No. 2.

STATEMENT OF CONTRACTS LET PRIOR TO 1911.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PROPORTION OF WORK COMPLETED DEC. 31, 1911.
Wash Borings No. 1	July 2, 1906.	B. F. Smith & Bro.	Completed July 28, 1906.
Testing Plant	Oct. 17, 1906.	Malcolm W. Hill Co.	Completed July 1, 1907.
Laboratory	Oct. 18, 1906.	Wm. Kirkpatrick	Completed Feb. 1, 1907.
Storm Water No. 1	Oct. 18, 1906.	M. A. Talbott Co.	Completed April 14, 1908.
Sanitary Sewers—Walbrook	Oct. 29, 1906.	M. A. Talbott Co.	Completed June 27, 1907.
Outfall Sewer, Section No. 1	Dec. 7, 1906.	M. A. Talbott Co.	Completed August 1, 1909.
Outfall Sewer, Section No. 2	Dec. 7, 1906.	M. A. Talbott Co.	Completed August 6, 1908.
Sewage Pumping Plant Mach'y.	Dec. 12, 1906.	Bethlehem Steel Co.	97 per cent.
West Low Level Interceptor, Section No. 1	May 1, 1907.	Metropolitan Contr. Co.	Completed March 26, 1908.
West Low Level Interceptor, Section No. 2	May 1, 1907.	Metropolitan Contr. Co.	Completed March 26, 1908.
Outfall Sewer, Section No. 3	May 4, 1907.	J. Connelly Const. Co.	Completed June 7, 1909.
Outfall Sewer, Section No. 7	May 4, 1907.	J. Connelly Const. Co.	Completed Dec. 19, 1908.
Outfall Sewer, Section No. 8	May 4, 1907.	J. Connelly Const. Co.	Completed Nov. 1, 1908.
Outfall Sewer, Section No. 9	May 4, 1907.	A. F. Helm	Completed Oct. 13, 1908.
Outfall Sewer, Section No. 6	May 28, 1907.	David Peoples	Completed Oct. 16, 1908.
Storm-Water No. 2	May 28, 1907.	David Peoples	Completed May 11, 1909.
Storm-Water No. 3	May 28, 1907.	David Peoples	Completed May 15, 1909.
High Level Interceptor, Section No. 1	May 29, 1907.	M. A. Talbott Co.	Completed Nov. 5, 1908.
High Level Interceptor, Section No. 2	May 29, 1907.	M. A. Talbott Co.	Completed May 1, 1909.

TABLE No. 2—*Continued.*

STATEMENT OF CONTRACTS LET PRIOR TO 1911.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PROPORTION OF WORK COMPLETED DEC. 31, 1911.
Outfall Sewer, Section No. 4.	May 29, 1907.	M. A. Talbott Co......	Completed March 17, 1909.
Outfall Sewer, Section No. 5..	May 29, 1907.	M. A. Talbott Co......	Completed August 1, 1909.
Outfall Sewer, Section No. 10.	June 10, 1907.	J. Connelly Const. Co....	Completed Nov. 1, 1908.
	NOTE.—This contract was first awarded to J. Erwin Hillpot, but he was unable to furnish satisfactory bond and the contract was reawarded to the J. Connelly Construction Company, the next lowest bidder.		
Sewage Disposal Plant, Clearing and Grubbing Disposal Area	July 8, 1907.	Lane Bros. Co. & Jones..	Completed Sept. 1, 1909.
	NOTE.—This contract was awarded on April 24 to J. Erwin Hillpot, but he was unable to furnish a satisfactory bond and the work was readvertised.		
Digging Test Well on site of Sewage Pumping Station....	July 29, 1907.	**Metropolitan Contr. Co.**	Completed August 27, 1907.

TABLE No. 2—*Continued.*

STATEMENT OF CONTRACTS LET PRIOR TO 1911.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PROPORTION OF WORK COMPLETED DEC. 31, 1911.
West Low Level Interceptor, Section No. 3	Feb. 28, 1908.	Metropolitan Contr. Co.	Completed Oct. 30, 1908.
East Low Level Interceptor, Section No. 1	May 8, 1908.	T. J. O'Connell	Completed May 15, 1909.
East Low Level Interceptor, Section No. 2	May 8, 1908.	T. J. O'Connell	Completed May 15, 1909.
Grading Manderson lot	May 8, 1908.	Gustavus Heckel	Completed June 29, 1908.
Sewage Pumping Station, Superstructure	May 9, 1908.	Noel Construction Co.	98 per cent.
Sewage Pumping Station, Substructure	May 9, 1908.	Noel Construction Co.	Completed August 1, 1911.
Storm Water Contract No. 4	June 17, 1908.	Reilly & Riddle	Completed March 16, 1909.
Roadway, Willis avenue	Aug. 7, 1908.	L. B. McCabe	Completed Nov. 30, 1908.
Storm Water Contract No. 5	Sept. 17, 1908.	David Peoples	Completed Jan. 23, 1909.
Roadways on Baltimore Brick Company's property	Sept. 28, 1908.	Thos. Mullan	Completed Dec. 7, 1908.
West Low Level Interceptor, Section No. 4	Oct. 28, 1908.	Metropolitan Contr. Co.	Completed July 10, 1909.
Force Main	Nov. 2, 1908.	Warren F. Brenizer Co.	Completed Oct. 12, 1909.
Force Main Sewer	Nov. 4, 1908.	Ryan & Reilly	Completed Sept. 30, 1909.
Sewage Disposal Plant	Nov. 4, 1908.	New York Continental Jewell Filtration Co.	Completed Dec. 23, 1910.
Storm Water Contract No. 6	Dec. 31, 1908.	Booth & Flinn	Completed Jan. 28, 1910.

TABLE No. 2—*Continued.*

STATEMENT OF CONTRACTS LET PRIOR TO 1911.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PROPORTION OF WORK COMPLETED DEC. 31, 1911.
Filter Stone for Sewage Disposal Plant	Dec. 31, 1908.	Fisher & Carozza	Completed June 1, 1911.
Sanitary Contract No. 35, Lateral Sewers, District No. 26.	Mar. 6, 1909.	T. Wallace Reilly	Completed Oct. 7, 1909.
Sanitary Contract No. 37, Sewage Disposal Plant, water Tanks and Tower	Feb. 19, 1909.	Horace E. Horton (Chicago Bridge and Iron Works)	Completed Sept. 1, 1909.
Sanitary Contract No. 38, Lateral Sewers, District No. 28.	April 19, 1909.	Ryan & Reilly	Completed Nov. 10, 1909.
Sanitary Contract No. 39, Lateral Sewers, District No. 30.	April 15, 1909.	James Ferry & Sons	Completed Sept. 25, 1909.
Sanitary Contract No. 40, Forest Park Sewage Disposal Works	Sept. 15, 1909.	Lane Bros. Co. & Jones.	Completed Oct. 25, 1910.
Sanitary Contract No. 41, Trunk Sewers, District No. 48	Sept. 10, 1909.	T. Wallace Reilly	Contract abandoned June 15, 1910. 72% of work completed.
Sanitary Contract No. 42, Jones Falls Interceptor, Section No. 1	Sept. 22, 1909.	M. A. Talbott Co.	Completed Oct. 15, 1910.
Sanitary Contract No. 43, Lateral Sewers, District No. 29.	Sept. 11, 1909.	Wm. McCarthy & Co.	Completed April 25, 1910.

TABLE No. 2—*Continued.*

STATEMENT OF CONTRACTS LET PRIOR TO 1911.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PROPORTION OF WORK COMPLETED DEC. 31, 1911.
Sanitary Contract No. 44, Lateral Sewers, District No. 21.	Dec. 18, 1909.	David Peoples	Completed Aug. 15, 1910.
Sanitary Contract No. 45, Lateral Sewers, District No. 27.	Dec. 18, 1909.	David Peoples	Completed Aug. 8, 1910.
Storm Water Contract No. 7	June 2, 1909.	Wm. McCarthy & Co.	Completed Dec. 31. 1909.
Storm Water Contract No. 8	Sept. 11, 1909.	M. O'Herron & Co.	Completed Dec. 31. 1909.
Sanitary Contract No. 46, Power-house, Pump House and Land Conduits, Sewage Disposal Plant	Feb. 21, 1910.	Ryan & Reilly	Completed April 1, 1911.
Sanitary Contract No. 47, Underwater Discharge Conduits, Sewage Disposal Plant.	Mar. 10, 1910.	B. F. Sweeten & Son	Completed Dec. 2, 1911.
Sanitary Contract No. 48, Lateral Sewers, District 19-B.	Feb. 28, 1910.	Irwin Brothers	Completed Oct. 15, 1910.
Sanitary Contract No. 49, Lateral Sewers, District No. 35.	Feb. 28, 1910.	Irwin Brothers	Completed Aug. 12, 1910.
Sanitary Contract No. 50, Jones Falls Interceptor, Section No. 2	May 20, 1910.	United Engineering & Construction Co.	Completed May 18, 1911.
Sanitary Contract No. 51, Electrical and Mechanical Equipment, Sewage Disposal Plant.	May 21, 1910.	McCay Engineering Co.	98 per cent.

TABLE No. 2—*Concluded.*

STATEMENT OF CONTRACTS LET PRIOR TO 1911.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PROPORTION OF WORK COMPLETED DEC. 31, 1911.
Sanitary Contract No. 52, Lateral Sewers, District No. 19-A, etc.	June 9, 1910.	Wm. McCarthy & Co.	Completed Jan. 16, 1911.
Sanitary Contract No. 53, Lateral Sewers, District No. 25, etc.	June 23, 1910.	D. V. Ault & Co.	Completed Dec. 7, 1910.
Sanitary Contract No. 54, Trunk Sewers, District No. 48.	July 28, 1910.	W. H. & C. F. Thompson.	Completed Mar. 10, 1911.
Sanitary Contract No. 55, Lateral Sewers, District No. 14.	Sept. 16, 1910.	B. F. Sweeten & Son.	Completed April 12, 1911.
Sanitary Contract No. 56, Coal and Ash Conveying Plant, Sewage Pumping Station.	Sept. 20, 1910.	Dietz Engineering Co.	85 per cent.
Sanitary Contract No. 57, Lateral Sewers, District No. 34-A.	Nov. 10, 1910.	Whiting-Middleton Construction Co.	Completed July 14, 1911.
Sanitary Contract No. 58, McMechen Street Interceptor.	Nov. 23, 1910.	McCay Engineering Co.	Completed April 3, 1911.
Sanitary Contract No. 59, Electric Wiring, Sewage Pumping Station.	Dec. 16, 1910.	Central Electric Co.	75 per cent.
Storm Water Contract No. 9.	Mar. 26, 1910.	David Peoples.	Completed June 27, 1911.
Storm Water Contract No. 10.	July 29, 1910.	George F. Beavin.	Completed Dec. 24, 1910.

STATEMENT OF CONTRACTS LET DURING THE YEAR 1911, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1911.
Sanitary Contract No. 60, Sewage Disposal Plant Laboratory Building.	D. M. Andrew Company.	June 3, 1911	Dimensions 35 feet by 65 feet. NOTE.—In awarding this contract, consideration was taken of the fact that D. M. Andrews Company offered to do the work in less time than the other low bidder.	$27,000.00	$27,000.00	90 per cent.
Sanitary Contract No. 61, Lateral Sewers, District 40-C.	B. F. Sweeten & Son.	Jan. 10, 1911	44,000 lin. ft. 8-inch sewer. 2,150 lin. ft. 10-inch sewer. 700 lin. ft. 12-inch sewer. 1,150 lin. ft. 15-inch sewer. 425 lin. ft. 18-inch sewer. 56 lin. ft. 24-inch sewer. 125 cu. yds. concrete masonry. 2,500 lin. ft. 4-inch and 6-inch under-drain. 676 M. ft., B. M., sheeting, sheet-piling, etc. 2,240 ft. manholes. 290 manhole frames and covers. 1,750 manhole steps. 34 drop connections. 16,100 lin. ft. vitrified-pipe house-connections. 3,330 branches. 350 lin. ft. vitrified-pipe stand-pipe. 33 lamp-hole frames and covers. 99 water-supply cocks in terminal manholes. 1,500 lin. ft. 1¼-inch pipe for water supply to terminal manholes.	92,090.30	94,736.85	Completed Nov. 1, 1911.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1911, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1911.
Sanitary Contract No. 62, Pratt Street Trunk Sewer.	McCay Engineering Company.	Mar. 9, 1911	4,015 lin. ft. earth excavation in tunnel.	$82,751.73	$85,116.60	Completed Dec. 18, 1911.
			385 lin. ft. 12-inch sewer.			
			1,320 lin. ft. 15-inch sewer.			
			625 lin. ft. 18-inch sewer.			
			580 lin. ft. 20-inch sewer.			
			1,985 lin. ft. 22-inch sewer.			
			270 lin. ft. 24-inch sewer.			
			250 cu. yds. excavation below sub-grade.			
			5 cu. yds. brick masonry.			
			520 cu. yds. concrete masonry.			
			4,000 lin. ft. 4 and 6 inch underdrain.			
			240 M. ft., B. M., sheeting, sheet-piling, etc.			
			410 lin. ft. manholes.			
			1 drop manhole.			
			21 manhole frames and covers.			
			275 manhole steps.			
			14 drop connections.			
			4.275 lin. ft. house connections.			
			454 branches.			
			610 lin. ft. vitrified-pipe standpipes.			
			660 lin. ft. cast-iron soil-pipe standpipes.			

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1911, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1911.
Sanitary Contract No. 63, Lateral Sewers, District No. 15.	Wm. McCarthy & Co.	Mar. 11, 1911	12,500 lin. ft. 8-inch sewer.	$75,187.00	$79,890.50	Completed Nov. 2, 1911.
			15,000 lin. ft. 10-inch sewer.			
			4,500 lin. ft. 12-inch sewer.			
			450 lin. ft. 15-inch sewer.			
			150 cu. yds. excavation below sub-grade.			
			10 cu. yds. reinforced concrete masonry.			
			110 cu. yds. concrete masonry.			
			4,000 lin. ft. 4 and 6 inch underdrain.			
			455 M. ft., B. M., sheeting, sheet-piling, etc.			
			1,900 lin. ft. manholes.			
			190 manhole frames and covers.			
			1,400 manhole steps.			
			32 drop connections.			
			12,600 lin. ft. vitrified-pipe house-connections.			
			2,025 branches.			
			230 lin. ft. vitrified-pipe standpipes.			
			20 lamphole frames and covers.			
			60 1-inch water-supply cocks in terminal manholes.			
			1,000 lin. ft. 1¼-inch pipe for water supply to terminal manholes.			

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1911, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1911.
Sanitary Contract No. 64, Sewage Pumping Station, Water-Piping and Steam Heating.	Warner Steam & Hot Water Heating Company.	Mar. 6, 1911	Steam heating plant and water-supply piping for the Sewage Pumping Station.	$3,052.15	$3,100.00	90 per cent.
Sanitary Contract No. 65, Sewage Disposal Plant, Sewage Screens.	....	....	Sewage screens for Sewage Disposal Works.	....	....	Bids rejected.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1911, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1911.
Sanitary Contract No. 66, Lateral Sewers, District No. 36-A.	B. F. Sweeten & Son.	June 15, 1911	31,000 lin. ft. 8-inch sewer. 3,650 lin. ft. 10-inch sewer. 800 lin. ft. 12-inch sewer. 2,050 lin. ft. 15-inch sewer. 2,525 lin. ft. 18-inch sewer. 350 lin. ft. 20-inch sewer. 300 lin. ft. 22-inch sewer. 150 cu. yds. excavation below sub-grade. 110 cu. yds. rock excavation. 10 cu. yds. brick masonry. 45 cu. yds. concrete masonry. 2,500 lin. ft. 4 and 6 inch underdrain. 506 M. ft., B. M., sheeting, sheet-piling, etc. 2,480 lin. ft. manholes. 1 special manhole. 280 manhole frames and covers. 1,900 manhole steps. 32 drop connections. 12,240 lin ft. house connections. 2,688 branches. 500 lin. ft. vitrified-pipe standpipes. 34 lamphole frames and covers. 70 1-inch water-supply cocks in terminal manholes. 1,100 1¼-inch water-supply pipes to terminal manholes.	$87,644.75	$96,017.50	88 per cent.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1911, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1911.
Sanitary Contract No. 67, Sewage Pumping Station, Junction of Sewer.	Martin J. Beach	June 8, 1911	85 cu. yds. sewer brick masonry. 500 cu. yds. concrete masonry. 50 sq. yds. granolithic floor. 20,000 lbs. reinforcing steel bars. 200 lin. ft. 18-inch drain. 170 lin. ft. 12 and 15 inch underdrain. 82 M. ft., B. M., sheeting, sheet-piling, etc. 800 sq. yds. water-proofing. 2 manhole frames and covers. 50 manhole steps. 100 lin. ft. house connections. 10 lin. ft. cut granite sill. NOTE.—This contract included 41.30 ft. of 84-inch sewer, 59.25 ft. of 60-inch sewer, a bellmouth 14.70 ft. long, and a grit chamber 46.5 ft. long, all constructed of concrete with brick-lined inverts.	$16,957.50	$20,937.25	Completed Dec. 30, 1911.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1911, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1911.
Sanitary Contract No. 68, Sewage Disposal Plant, Nozzles for Sprinkling Filters.	Merritt & Co.	Aug. 21, 1911	1,200 nozzles and deflectors. 1,200 special castings.	$2,900.00	$5,700.00	Completed.
Sanitary Contract No. 69, Fixed Screens at Sewage Disposal Works and Sewage Pumping Station.	H. S. Roberts.	July 27, 1911	Fixed screens, etc., for the Sewage Disposal Works and for the Sewage Pumping Station.	$4,723.00	$7,487.00	95 per cent.
Sanitary Contract No. 70, Sewage Disposal Plant, Pier over Discharge Pipes.	....	....	Pier over Discharge Pipes at Sewage Disposal Works.	....	....	Withdrawn.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1911, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1911.
Sanitary Contract No. 71, Lateral Sewer in Alley west of Park Heights Avenue north of Fifth Avenue.	G. R. Roberts.	Aug. 9, 1911	530 lin. ft. 8-inch sewer. 10 cu. yds. excavation below sub-grade. 40 cu. yds. rock excavation. 400 lin. ft. 4-inch underdrain. 1,000 lin. ft. sheeting, sheet-piling, etc. 25 lin. ft. manholes. 3 manhole frames and covers. 18 manhole steps. 160 lin. ft. vitrified-pipe house-connections.	$998.45	$1,132.05	Completed Sept. 30, 1911.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1911, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1911.
Sanitary Contract No. 72, Sewage Pumping Station, Discharge Piping and Valves.	B. F. Sweeten & Son.	Aug. 17, 1911	100 tons 42-inch C. I. pipe. 3 tons 6-inch C. I. pipe. 2 42-inch Venturi meters. 60 cu. yds. concrete. 15 cu. yds. brick masonry. 145 sq. yds. water-proofing. 2,000 lbs. reinforcing steel. 27 M. ft.. B. M., sheeting, sheet-piling, etc. 8 42-inch electrically-operated gate valves. 6 6-inch gate valves.	$29,093.50	$33,201.84	48 per cent.
Sanitary Contract No. 73, Sewage Pumping Station, Electric Generators and Switchboard.	Thos. C. Basshor Co.	Sept. 18, 1911	1 35-K. W. Generator with compound engine. 1 15-K. W. Generator with simple engine. Foundations for generators. Piping. Main switchboard and connections.	$5,712.00	$6,947.00	25 per cent.

STATEMENT OF CONTRACTS LET DURING THE YEAR 1911, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1911.
Sanitary Contract No. 74, Lateral Sewers, District No. 20-B.	B. F. Sweeten & Son.	Sept. 22, 1911	53,000 lin. ft. 8-inch sewer.	$145,830.75	$156,426.60	13 per cent.
			485 lin. ft. tunnel for 10-inch sewer.			
			2,785 lin. ft. 10-inch sewer.			
			800 lin. ft. 12-inch sewer.			
			1,900 lin. ft. 15-inch sewer.			
			1,000 lin. ft. 18-inch sewer.			
			280 lin. ft. 20-inch sewer.			
			1,025 lin. ft. 22-inch sewer.			
			1,020 lin. ft. 24-inch sewer.			
			250 cu. yds. excavation below sub-grade.			
			300 cu. yds. rock excavation.			
			10 cu. yds. sewer brick masonry.			
			510 cu. yds. concrete masonry.			
			3,000 lin. ft. 4 and 6 inch underdrain.			
			610 M. ft., B. M., sheeting, sheet-piling, etc.			
			4,400 lin. ft. manholes.			
			390 manhole frames and covers.			
			3,400 manhole steps.			
			100 drop connections.			
			25,800 lin. ft. vitrified-pipe house-connections.			
			3,990 branches.			
			1,100 lin. ft. vitrified-pipe standpipes.			
			50 lamphole frames and covers.			
			118 1-inch water-supply cocks in terminal manholes.			
			1,600 lin. ft. 1¼-inch water-supply pipe to terminal manholes.			

STATEMENT OF CONTRACTS LET DURING THE YEAR 1911, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1911.
Sanitary Contract No. 75, High Level Interceptor, Section No. 4.	W. H. & C. F. Thompson.	Sept. 25, 1911	11,000 cu. yds. earth excavation and refill in open trench. 1,366 lin. ft. tunnel. 100 cu. yds. excavation below sub-grade. 450 cu. yds. sewer-brick masonry. 10 cu. yds. vitrified-brick masonry. 4,325 cu. yds. concrete masonry. 11,000 lbs. steel reinforcing. 1,500 lin. ft. 6 and 8 inch underdrain. 235 M. ft., B. M., sheeting, sheet-piling, etc. 6 manhole frames and covers. 125 manhole steps. 345 lin. ft. vitrified-pipe house-connections. 90 lin. ft. C. I. pipe house-connections and standpipes. NOTE.—This contract includes 2,890.6 ft. of the High Level Interceptor from a point in Eager Street 124 ft. east of the east building line of Calvert Street to a point in Cathedral Street 3.5 ft. north of the north building line of Centre Street. The sewer is constructed of concrete with a brick-lined invert and is 82 in. in diameter.	$95,733.75	$98,733.75	10 per cent.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1911, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1911.
Sanitary Contract No. 76, Lateral Sewer in Alley east of Park Heights Avenue between Third and Fifth Avenues.	W. H. & C. F. Thompson.	Sept. 25, 1911	840 lin. ft. 8-inch sewer. 400 cu. yds. rock excavation. 200 lin. ft. 4-inch underdrain. 36 lin. ft. standard manholes. 3 manhole frames and covers. 25 manhole steps. 135 lin. ft. vitrified-pipe house-connections. 68 branches.	$3,193.55	$3,211.25	Completed Nov. 3, 1911.
Sanitary Contract No. 77, Sewage Disposal Plant, Revolving Screens.	D'Olier Engineering Co.	Nov. 10, 1911	Revolving screens for Sewage Disposal Works.	$9,645.00	$13,197.00	5 per cent.

TABLE No. 3—*Continued*.

STATEMENT OF CONTRACTS LET DURING THE YEAR 1911, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1911.
Storm-Water Contract No. 11.	Wm. McCarthy & Co.	Jan. 13, 1911	450 lin. ft. 12-inch to 15-inch inlet-connections. 40 lin. ft. 15-inch circular drain. 262 lin. ft. 24-inch circular drain. 1,173 lin. ft. 30-inch circular drain. 345 lin. ft. 36-inch circular drain. 6 cu. yds. brick masonry. 6 cu. yds. concrete. 200 lbs. reinforcing steel. 10 M. ft., B. M., sheeting, sheet-piling, etc. 1,000 cu. yds. rock excavation. 6 manhole frames and covers. 45 lin. ft. manholes. 40 galvanized wrought-iron manhole steps. 13 inlets. 10 inlet heads.	$14,583.70	$15,845.35	Completed May 4, 1911.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1911, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1911.
Storm-Water Contract No. 12.	C. B. Clark & Co.	Mar. 30, 1911	12,100 cu. yds. earth excavation for 87-inch horseshoe-shaped drain. 448 lin. ft. 14-ft. by 7½ ft. rectangular drain. 1,687 lin. ft. 12 to 18 inch inlet connections. 2,371 lin. ft. 15 to 20 inch circular drain. 3,367 lin. ft. 24 to 36 inch circular drain. 231 cu. yds. brick masonry. 2,877 cu. yds. concrete. 98,000 lbs. reinforcing steel. 10,700 lbs. 12-inch and 9-inch I beams. 2,376 lin. ft. 4 to 8 inch underdrain. 170 M. ft., B. M., sheeting, sheet-piling, etc. 60 cu. yds. embankment. 500 cu. yds. rock excavation. 200 cu. yds. excavation for bellmouth. 299 lin. ft. manholes. 39 manhole frames and covers. 270 manhole steps. 71 inlets. 51 inlet heads.	$83,246.30	$88,438.58	99 per cent.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1911, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1911.
Storm-Water Contract No. 13.	Ryan & Reilly.	Sept. 22, 1911	21,800 cu. yds. earth excavation for 138 inch by 99 inch drain. 6,089 lin. ft. 12 to 18 inch inlet connections. 4,824 lin. ft. 15 to 20 inch circular drain. 20 lin. ft. 24-inch flat-topped drain. 9,222 lin. ft. 24 to 33 inch circular drain. 2,552 lin. ft. 36 to 45 inch circular drain. 450 cu. yds. brick masonry. 3,544 cu. yds. concrete. 281,770 lbs. reinforcing steel. 8,050 lbs. expanded metal for reinforcing. 5,500 lin. ft. 4 to 10 inch underdrain. 195 M. ft., B. M., sheeting, sheet-piling, etc. 3,500 cu. yds. embankment. 4,400 cu. yds. rock excavation. 94 manhole frames and covers. 651 lin. ft. manholes. 495 manhole steps. 196 inlets. 159 heads for inlets. 250 lin. ft. new granite curb. 350 lin. ft. curb removed and reset. Note.—This contract was awarded to Messrs. Ryan & Reilly for the reason that they undertook to complete the work in 150 working days, whereas the lowest bidder required 300 working days.	$173,229.26	$170,209.90 (See Note.)	21 per cent.

STATEMENT OF CONTRACTS LET DURING THE YEAR 1911, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1911.
Storm-Water Contract No. 14, Jones Falls Conduits, Section No. 1.	M. M. Elkan.	July 10, 1911	28,000 cu. yds. earth excavation. 900 cu. yds. rock excavation. 1,000 cu. yds. gravel refill. 40,000 cu. yds. concrete masonry. 750 cu. yds. brick masonry. 4,000,000 lbs. steel reinforcing. 12,000 sq. yds. granolithic surfacing. 140,000 lin. ft. of piles. 410 M. ft., B. M., sheeting, sheet-piling, etc. 50 tons C. I. pipe. 900 lin. ft. vitrified sewer pipe, 6 inches to 30 inches in diameter. 17 manhole frames and covers. 40 tons steel I beams. Tearing down and removing six bridges. NOTE.—This contract covers Section No. 1 of the Jones Falls Conduits, constructed with reinforced concrete, and comprises two (2) rectangular conduits 20 ft. wide and 15½ ft. high, and one (1) rectangular conduit 20 ft. wide and 12½ ft. high.	$533,990.00	$584,275.00	10 per cent.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1911, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1911.
Storm-Water Contract No. 15.	Martin J. Beach.	Sept. 9, 1911	110 lin. ft. 12-inch inlet connections. 190 lin. ft. 15-inch inlet connections. 285 lin. ft. 15-inch circular drain. 25 lin. ft. 18-inch circular drain. 410 lin. ft. 20-inch circular drain. 255 lin. ft. 24-inch circular drain. 27 cu. yds. concrete masonry. 200 lin. ft. 4 and 6 inch underdrain. 7 M. ft., B. M., sheeting, sheet-piling, etc. 10 cu. yds. rock excavation. 6 manhole frames and covers. 40 lin. ft. manholes. 10 inlets. - flush heads for inlets.	$3,720.40	$3,759.37	Completed Nov. 2, 1911.

STATEMENT OF CONTRACTS LET DURING THE YEAR 1911, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1911.
Storm-Water Contract No. 16, Jones Falls Conduits, Section No. 2.	Fisher & Carozza.	Nov. 6, 1911	8,000 cu. yds. earth excavation in trench. 8,000 cu. yds. earth excavation in tunnel. 13,700 cu. yds. rock excavation in trench. 33,500 cu. yds. rock excavation in tunnel. 250 cu. yds. brick masonry. 675 cu. yds. vitrified-brick masonry. 3,340,000 lbs. steel reinforcing. 11,000 sq. yds. granolithic surfacing. 57 tons plate girders. 110 M. ft., B. M., sheeting, sheet-piling, etc. 170 tons C. I. pipe. 900 lin. ft. vitrified sewer pipe, 6 inches to 30 inches in diameter. 18 manhole frames and covers. 4,000 lbs. iron-castings for Junction Chamber. 15 tons steel I beams. Tearing down and removing three bridges. NOTE.—This contract covers Section No. 2 of the Jones Falls Conduits, constructed with reinforced concrete, and comprises two (2) rectangular conduits 20 ft. wide and 15½ ft. high, and one (1) rectangular conduit 16 ft. wide and 15½ ft. high, and a section of tunnel in rock 29 ft. wide and 28 ft. high.	$703,989.50	$715,046.00	None.

LENGTHS OF SANITARY SEWERS OF THE VARIOUS SIZES AND MATERIALS CONSTRUCTED TO DECEMBER 31, 1911.

SIZE.	MATERIALS.	CONSTRUCTED PREVIOUS TO 1911. LINEAR FEET.	CONSTRUCTED IN 1911. LINEAR FEET.	TOTAL TO DEC. 31, 1911. LINEAR FEET.
11′ x 12′ 3″ Horseshoe	Brick and Concrete	26,351.80		26,351.80
10′ 9″ x 12′ Horseshoe	Brick and Concrete	3,879.21		3,879.21
100″ Diameter	Brick and Concrete	5,109.28		5,109.28
99″ Diameter	Brick and Concrete	4,610.45		4,610.45
84″ Diameter	Brick and Concrete	305.00	54.56	359.56
82″ Diameter	Brick and Concrete		400.00	400.00
80″ Diameter	Brick and Concrete	727.00		727.00
76″ Diameter	Brick and Concrete	633.60		633.60
75″ Diameter	Brick and Concrete	1,589.92	5.00	1,594.92
74″ Diameter	Brick and Concrete	1,931.00		1,931.00
66″ Diameter	Brick and Concrete	2,011.67		2,011.67
64″ Diameter	Brick and Concrete	1,423.00	1,065.75	2,488.75
60″ Diameter	Brick and Concrete	5,151.23	73.95	5,225.18
57″ Diameter	Brick and Concrete	742.90		742.90
56″ Diameter	Brick and Concrete	279.00	88.17	367.17
55″ Diameter	Brick and Concrete	963,88		963.88
52″ Diameter	Brick and Concrete	893.00	.72	893.72
51″ Diameter	Brick and Concrete	2,054.98		2,054.98
50″ Diameter	Brick and Concrete	454.00	337.78	791.78
48″ Diameter	Brick and Concrete	869.94		869.94
45″ Diameter	Brick and Concrete	1,440.00		1,440.00
42″ Diameter (Force Main)	Cast-Iron Pipe	10,440.00	130.00	10,570.00
36″ Diameter	Brick and Concrete	63.61		63.61

TABLE No. 4—*Concluded.*

LENGTHS OF SANITARY SEWERS OF THE VARIOUS SIZES AND MATERIALS CONSTRUCTED TO DECEMBER 31, 1911.

SIZE.	MATERIALS.	CONSTRUCTED PREVIOUS TO 1911. LINEAR FEET.	CONSTRUCTED IN 1911. LINEAR FEET.	TOTAL TO DEC. 31, 1911. LINEAR FEET.
30″ Diameter	Brick and Concrete	104.20	....	104.20
30″ Diameter	Terra-Cotta Pipe	....	89.20	89.20
27″ Diameter	Brick and Concrete	847.53	2,578.74	3,426.27
24″ Diameter	Terra-Cotta Pipe	6 009.04	1,912.08	7,921.12
24″ Diameter	Cast-iron Pipe	285.36	12.00	297.36
22″ Diameter	Terra-Cotta Pipe	7,607.42	3,182.19	10,789.61
20″ Diameter	Terra-Cotta Pipe	2,425.34	2,375.16	4,800.50
18″ Diameter	Terra-Cotta Pipe	3,400.35	4,036.51	7,436.86
16″ Diameter	Cast-Iron Pipe	218.00	1,022.44	1,240.44
15″ Diameter	Terra-Cotta Pipe	11,906.58	6,218.04	18,124.62
12″ Diameter	Terra-Cotta Pipe	11,854.14	5,953.86	17,808.00
10″ Diameter	Terra-Cotta Pipe	23,900.81	24,746.29	48.647.10
10″ Diameter	Cast-Iron Pipe	....	24.00	24.00
8″ Diameter	Terra-Cotta Pipe	260,257.61	113,688.40	373,946.01
8″ Diameter	Cast-Iron Pipe	492.40	....	492.40
Total Length	....	401,233.25	167,994.84	569,228.09
House Connections	....	158,890.82	63,608.00	222,498.82
Grand Total	....	560,124.07	231,602.84	791.726.91
Manholes		1,816	1,107	2,923
Lampholes		166	112	278
Spurs		20,140	11,273	31,413

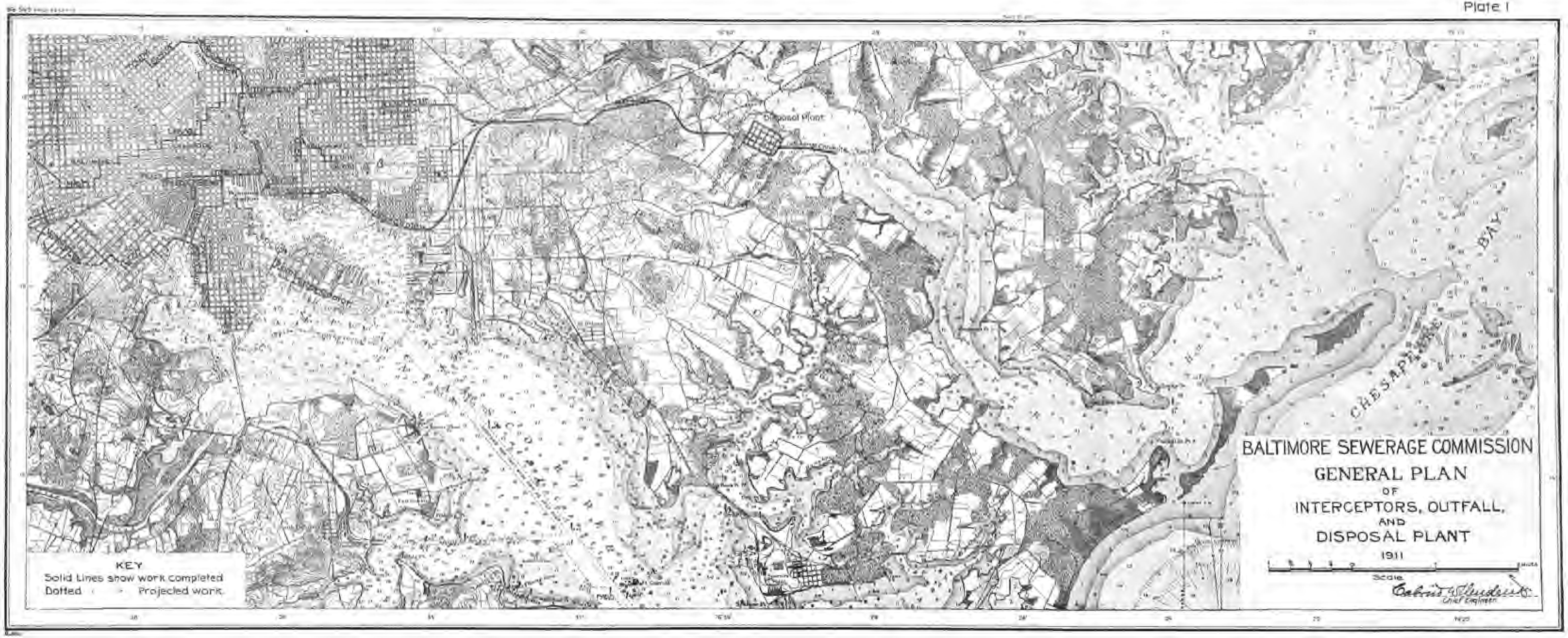
LENGTH OF STORM-WATER DRAINS OF THE VARIOUS SIZES AND MATERIALS CONSTRUCTED TO DECEMBER 31, 1911.

SIZE.	MATERIALS.	CONSTRUCTED PREVIOUS TO 1911. LINEAR FEET.	CONSTRUCTED IN 1911. LINEAR FEET.	TOTAL TO DEC. 31, 1911. LINEAR FEET.
Double Rectangular, 84″ x 60″	Concrete and Brick (Reinf.)	108.30		108.30
Double Rectangular, 69″ x 50″	Concrete and Brick (Reinf.)	2,856.91		2,856.91
Rectangular, 14′ 0″ x 7′ 6″	Concrete and Brick (Reinf.)		367.00	367.00
Rectangular, 66″ x 45″	Reinforced Concrete	1,470.30		1,470.30
Rectangular, 60″ x 42″	Concrete and Brick (Reinf.)	785.90		785.90
Rectangular, 60″ x 30″	Concrete and Brick (Reinf.)	76.79		76.79
Horseshoe, 138″ x 132″	Concrete and Brick	125.13		125.13
Horseshoe, 138″ x 99″	Concrete and Brick (Reinf.)		260.00	260.00
Horseshoe, 114″	Concrete and Brick	244.65		244.65
Horseshoe 87″	Concrete and Brick		1,013.00	1,013.00
Double Line, 30″	Cast-Iron Pipe	645.17		645.17
Circular, 114″	Concrete and Brick	1,112.69		1,112.69
Circular, 96″	Concrete and Brick	3,451.55		3,451.55
Circular, 72″	Concrete and Brick	1,250.00	9.91	1,259.91
Circular, 69″	Concrete and Brick	835.00	1,091.04	1,926.04
Circular, 66″	Concrete and Brick	169.35		169.35
Circular, 62″	Concrete and Brick (Reinf.)	245.64		245.64
Circular, 60″	Concrete and Brick	163.49		163.49
Circular, 57″	Concrete and Brick		83.47	83.47
Circular, 54″	Concrete and Brick (Reinf.)	550.32	445.00	995.32
Circular, 48″	Cast-Iron Pipe	41.99		41.99
Circular, 48″	Brick	1,453.27		1,453.27
Circular, 48″	Concrete and Brick	702.34		702.34
Circular, 48″	Concrete	1,054.83		1,054.83
Circular, 45″	Concrete		465.00	465.00
Circular, 42″	Cast-Iron Pipe	34.35		34.35
Circular, 42″	Brick	1,689.96		1,689.96
Circular, 42″	Concrete and Brick	1,701.60	49.99	1,751.59

LENGTH OF STORM-WATER DRAINS OF THE VARIOUS SIZES AND MATERIALS CONSTRUCTED TO DECEMBER 31, 1911.

Size.	Materials.	Constructed Previous to 1911. Linear Feet.	Constructed in 1911. Linear Feet.	Total to Dec. 31, 1911. Linear Feet.
Circular, 42″	Concrete	2,282.52	....	2,282.52
Circular, 36″	Brick	600.81	....	600.81
Circular, 36″	Concrete and Brick	6,701.99	315.90	7,017.89
Circular, 36″	Concrete	6,055.19	....	6,055.19
Circular, 33″	Brick	38.23	....	38.23
Circular, 33″	Concrete and Brick	4,067.37	1,232.00	5,299.37
Circular, 30″	Cast-Iron Pipe	914.33	....	914.33
Circular, 30″	Brick	183.50	7.00	190.50
Circular, 30″	Concrete and Brick	6,450.72	1,571.40	8,022.12
Circular, 30″	Vitrified Pipe	....	944.00	944.00
Circular, 30″	Concrete	4,522.68	....	4,522.68
Circular, 24″	Cast-Iron Pipe	494.13	....	494.13
Circular, 24″	Terra-Cotta Pipe	28,073.14	3,810.90	31,884.04
Circular, 20″	Cast-Iron Pipe	371.63	....	371.63
Circular, 20″	Terra-Cotta Pipe	9,696.26	1,499.61	11,195.87
Circular, 18″	Terra-Cotta Pipe	23,336.55	2,317.12	25,653.67
Circular, 15″	Terra-Cotta Pipe	20,682.77	1,585.41	22,268.18
Circular, 12″	Terra-Cotta Pipe	5,770.72	1.15	5,771.87
Jones Falls Conduits	....	....	285.00	285.00
Horseshoe, 96″ x 93″	Concrete and Brick	....	56.00	56.00
Inlet Connections, 10″ to 20″	Terra-Cotta Pipe	30,955.10	4,538.52	35,493.62
Totals	....	171,967.17	21,948.42	193,915.59
Inlets and Catch Basins		1,090	154	1,244
Manholes and Drop Wells		878	99	977

Plate I



BALTIMORE SEWERAGE COMMISSION

GENERAL PLAN

OF

INTERCEPTORS, OUTFALL,

AND

DISPOSAL PLANT

1911

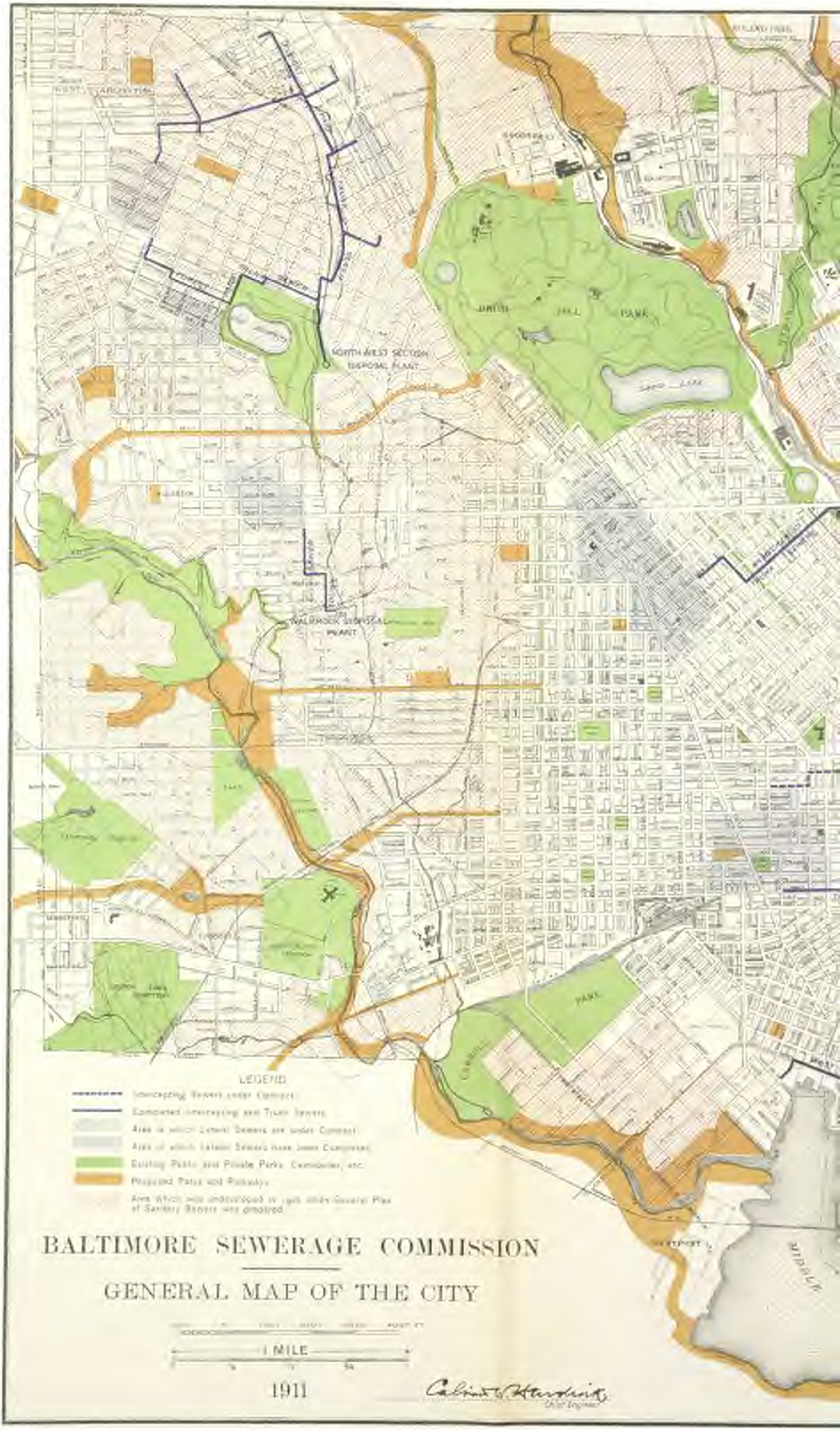
KEY

Solid Lines show work completed

Dotted " " Projected work.

Calvin W. Hendrick

Chief Engineer



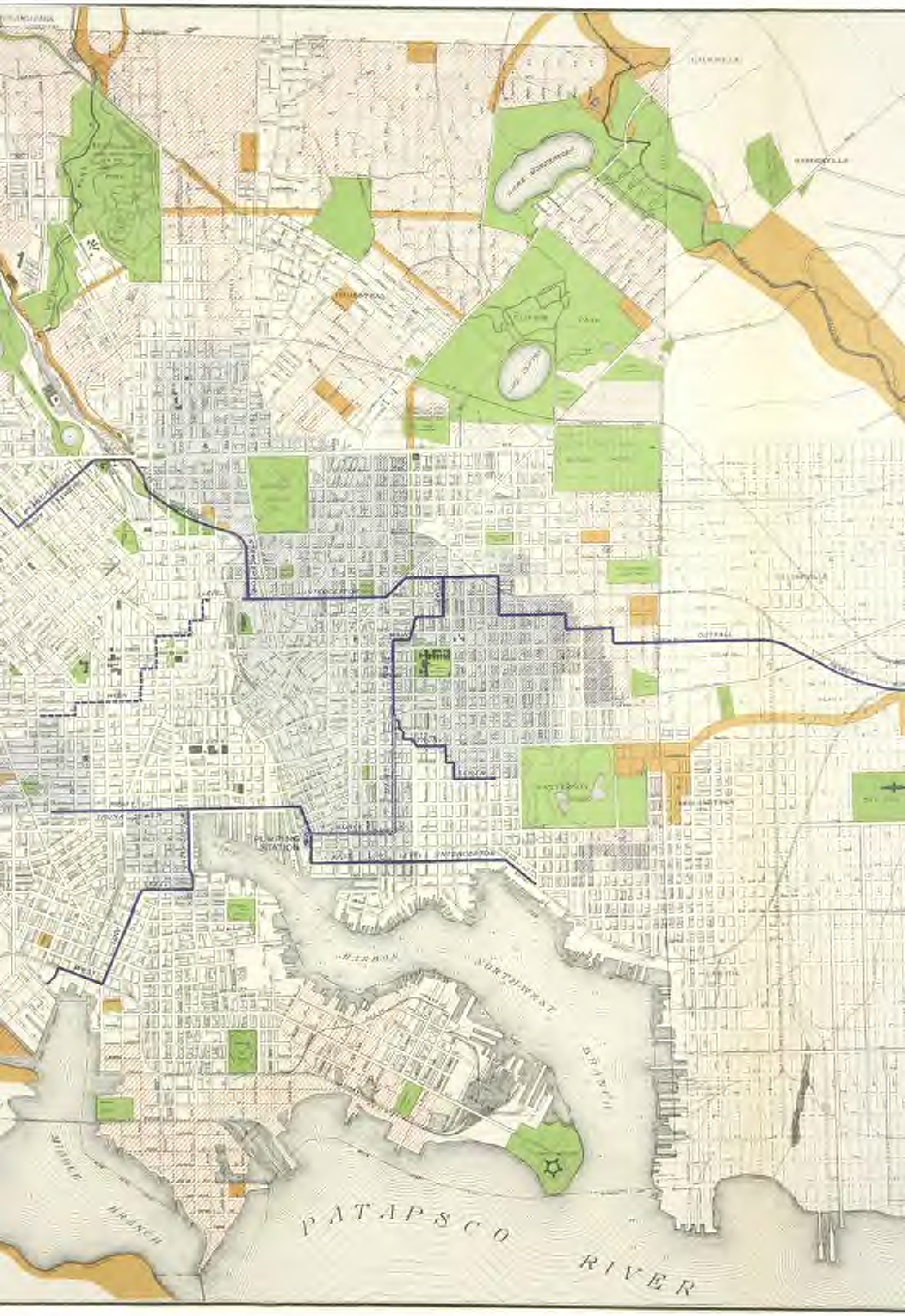
WEST ARLINGTON
ROLAND PARK
DRUID HILL PARK
DRUID LAKE
NORTH WEST SECTION DISPOSAL PLANT
WALBROOK DISPOSAL PLANT
PARK
CARROLL
MIDDLE
LEGEND
Intercepting Sewers under Contract
Completed Intercepting and Trunk Sewers
Area in which Lateral Sewers are under Contract
Area in which Lateral Sewers have been Completed
Existing Public and Private Parks, Cemeteries, etc.
Proposed Parks and Parkways
Area which was undeveloped in 1906 when General Plan of Sanitary Sewers was prepared
1 MILE

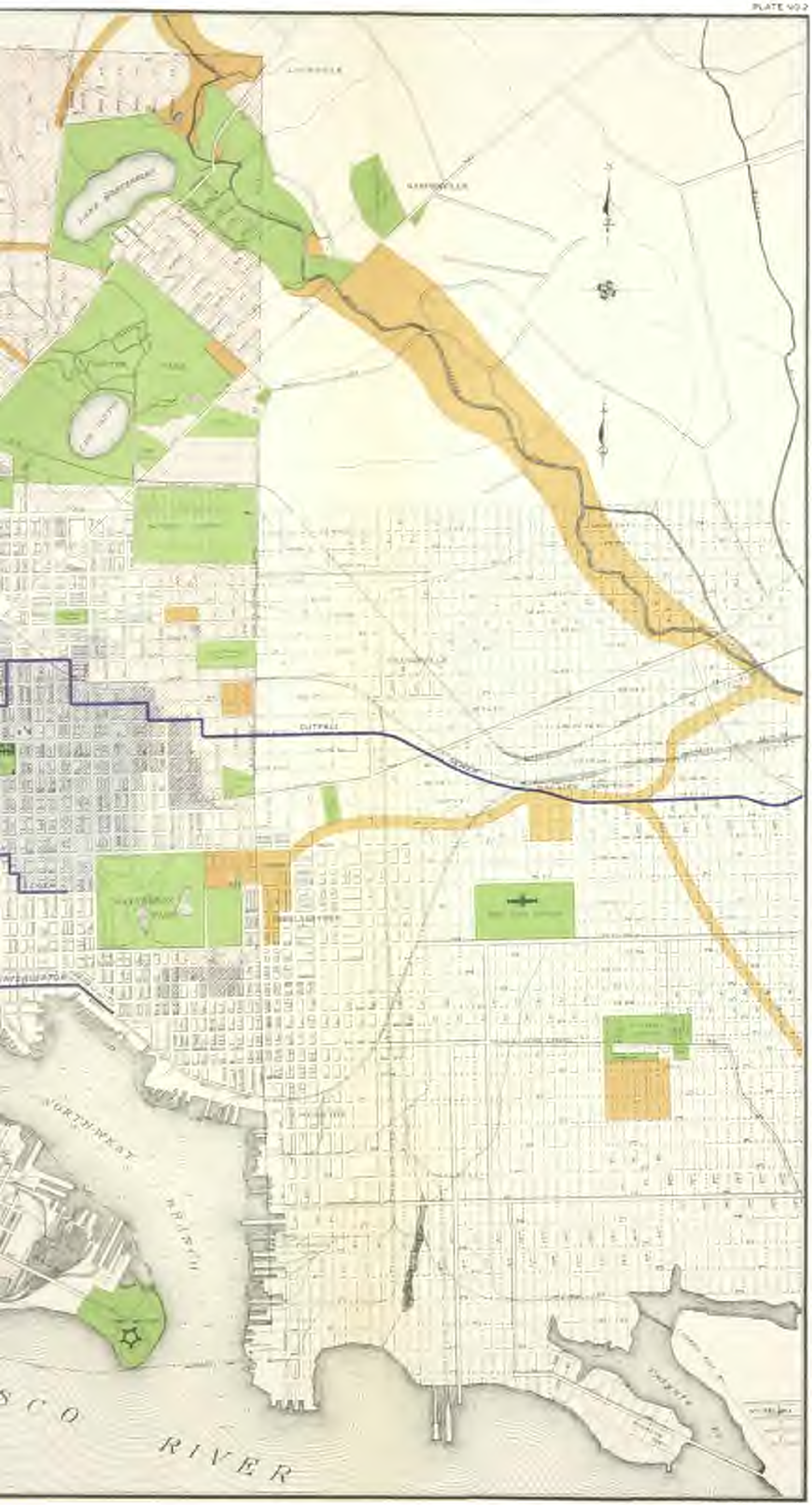
BALTIMORE SEWERAGE COMMISSION

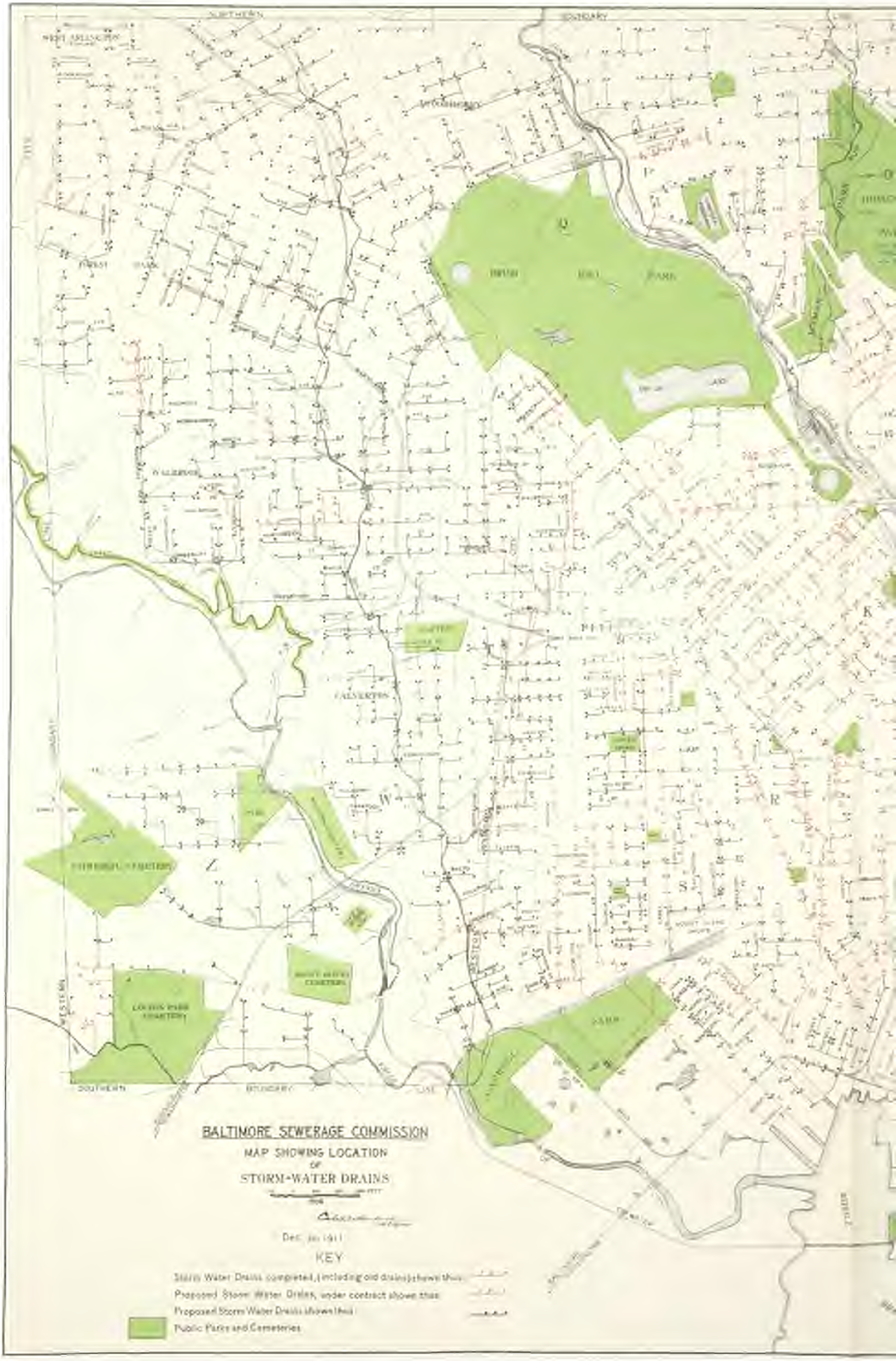
GENERAL MAP OF THE CITY

1911

Calvin W. Hendrick
Chief Engineer

CLIFTON PARK
PATTERSON
PUMPING STATION
HARBOR
NORTHWEST BRANCH
MIDDLE BRANCH
PATAPSCO RIVER


LAKE MONTEBELLO
CLIFTON
PARK
LAKE CLIFTON
OUTFALL
PATTERSON
PARK
NORTHWEST
BRANCH
SCO
RIVER



BALTIMORE SEWERAGE COMMISSION

MAP SHOWING LOCATION
OF
STORM-WATER DRAINS

Dec. 30, 1911

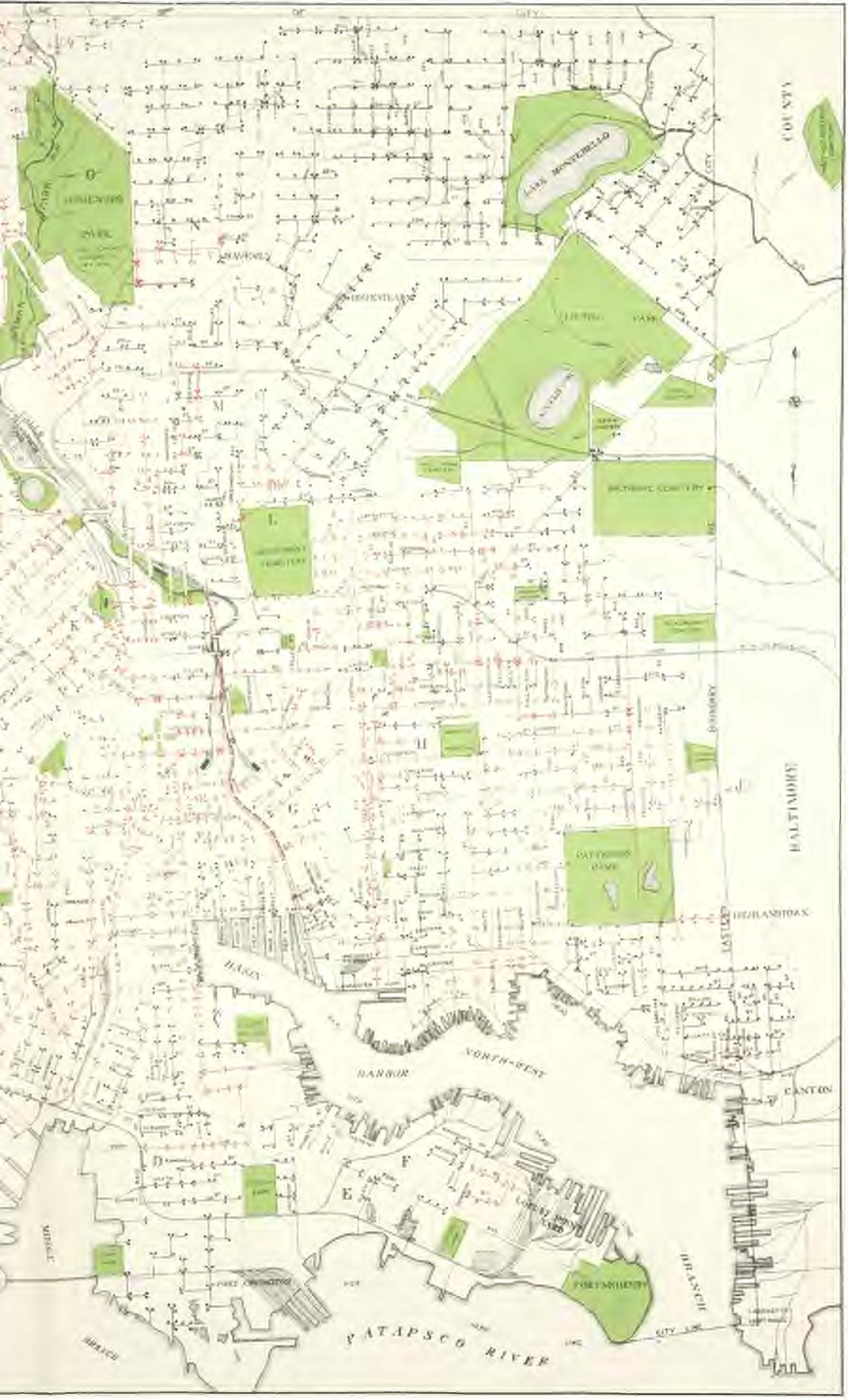
KEY

Storm Water Drains completed, (including old drains) shown thus

Proposed Storm Water Drains, under contract shown thus

Proposed Storm Water Drains shown thus

🟩 Public Parks and Cemeteries


OF
CITY
LAKE MONTEBELLO
PARK
O
N
WAVERLY
HOMESTEAD
CLIFTON PARK
M
BALTIMORE CEMETERY
L
GREENMOUNT CEMETERY
K
H
G
PATTERSON PARK
HIGHLANDTOWN
EASTERN
BALTIMORE
COUNTY
BASIN
HARBOR
NORTH-WEST
CANTON
D
F
E
LOCUST POINT YARD
FORT McHENRY
PORT COVINGTON
BRANCH
MIDDLE
BRANCH
PATAPSCO RIVER
CITY LINE

APPENDIX I

PART I

Analysis of Raw and Settled Sewage, Filtered Effluents and Settled Effluents

TABLES 1 TO 42, INCLUSIVE

TABLE No. 1.

Period Covered 1907-8		Temp. Degrees Cent.	Parts per Million												Bacteria per C. C.	Rate of Flow. Gallons per 24 Hours
			Susp'd Solids			Nitrogen as						Oxygen Consumed				
						Organic										
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates	Total	Dissolved	Suspended		
			Raw Sewage.													
Aug. 1	Aug. 2	-----	182.0	130.0	52.0	10.0	10.0	0.0	14.0	0.40	2.0	34	27.0	7.0	----------	18,500
Aug. 3	Aug. 4	-----	100.0	92.0	8.0	16.0	10.0	6.0	12.0	0.25	2.0	23	17.0	6.0	----------	--------
Aug. 5	Aug. 6	-----	76.0	66.0	10.0	8.0	4.0	4.0	19.0	0.15	0.3	50	42.0	8.0	6,900,000	18,500
Aug. 9	Aug. 10	-----	146.0	81.0	65.0	17.0	15.0	2.0	14.0	1.80	3.5	22	18.0	4.0	4,500,000	27,500
Aug. 11	Aug. 12	-----	102.0	91.0	11.0	----	----	----	18.0	0.00	0.2	26	21.0	5.0	4,600,000	21,000
Aug. 13	Aug. 14	-----	75.0	55.0	20.0	15.0	14.0	1.0	19.0	0.18	0.3	28	27.0	1.0	2,500,000	22,500
Aug. 19	Aug. 20	19.5	1,402.0	322.0	1,080.0	27.0	18.0	9.0	19.0	0.80	2.0	66	32.0	34.0	1,600,000	26,500
Aug. 21	Aug. 22	19.0	296.0	106.0	190.0	14.0	12.0	2.0	20.0	0.80	2.5	56	40.0	16.0	1,900,000	22,500
Aug. 23	Aug. 24	19.0	129.0	69.0	60.0	16.0	14.0	2.0	18.0	0.70	3.5	16	12.0	4.0	2,600,000	49,500
Aug. 27	Aug. 28	19.0	168.0	136.0	32.0	17.0	15.0	2.0	21.0	0.20	1.5	58	47.0	11.0	7,800,000	20,000
Aug. 29	Aug. 30	19.0	127.0	97.0	30.0	16.0	15.0	1.0	24.0	0.05	0.4	39	34.0	5.0	2,000,000	22,500
Aug. 31	Sept. 1	19.0	154.0	120.0	34.0	19.0	15.0	4.0	21.0	0.40	1.3	36	16.0	20.0	----------	40,500
Sept. 4	Sept. 5	20.0	120.0	90.0	30.0	21.0	17.0	4.0	19.0	0.10	0.0	54	35.0	19.0	----------	35,500
Sept. 6	Sept. 7	19.5	220.0	140.0	80.0	15.0	11.0	4.0	23.0	0.20	0.1	62	32.0	30.0	----------	50,500
Sept. 8	Sept. 9	21.0	176.0	118.0	38.0	11.0	10.0	1.0	23.0	0.01	0.0	55	36.0	19.0	----------	46,500
Sept. 14	Sept. 15	-----	230.0	197.0	33.0	18.0	16.0	2.0	22.0	0.18	0.0	48	34.0	14.0	----------	50,000
Sept. 16	Sept. 17	21.0	228.0	166.0	62.0	20.0	14.0	6.0	21.0	0.80	0.0	71	19.0	52.0	----------	62,500
Sept. 20	Sept. 21	21.0	152.0	144.0	8.0	21.0	17.0	4.0	18.0	0.00	0.0	50	35.0	15.0	5,600,000	49,000
Sept. 22	Sept. 23	-----	148.0	114.0	34.0	17.0	11.0	6.0	17.0	0.03	0.0	22	8.0	14.0	----------	61,000
Sept. 24	Sept. 25	20.0	202.0	146.0	56.0	22.0	17.0	5.0	12.0	0.40	0.3	46	29.0	17.0	8,600,000	82,000
Sept. 28	Sept. 29	-----	132.0	124.0	8.0	15.0	12.0	3.0	16.0	2.40	5.0	26	15.0	11.0	8,200,000	139,000
Sept. 30	Oct. 1	19.5	236.0	208.0	28.0	26.0	22.0	4.0	15.0	0.20	0.0	63	16.0	47.0	2,000,000	65,000
Oct. 2	Oct. 3	19.0	246.0	222.0	24.0	19.0	12.0	7.0	21.0	0.00	0.0	37	21.0	16.0	----------	67,500
Oct. 6	Oct. 7	19.0	172.0	168.0	4.0	20.0	14.0	6.0	25.0	0.00	0.0	62	34.0	28.0	2,200,000	43,000
Oct. 8	Oct. 9	19.0	184.0	160.0	24.0	19.0	10.0	9.0	22.0	0.03	0.0	58	30.0	28.0	1,800,000	32,000
Oct. 10	Oct. 11	19.0	312.0	176.0	136.0	14.0	10.0	4.0	24.0	0.30	0.2	66	13.0	53.0	2,700,000	47,000
Oct. 21	---- --	-----	First Compartment of Settling Tank Emptied.													
Oct. 22	Oct. 23	17.0	168.0	140.0	28.0	18.0	----	----	23.0	0.08	0.0	55	38.0	17.0	----------	37,500
Oct. 24	Oct. 25	16.5	172.0	156.0	16.0	20.0	----	----	23.0	0.10	0.0	45	31.0	14.0	1,600,000	--------
Oct. 26	Oct. 27	-----	148.0	116.0	32.0	20.0	----	----	21.0	0.10	1.0	56	26.0	30.0	----------	57,500
Oct. 30	Oct. 31	-----	148.0	136.0	12.0	21.0	----	----	26.0	0.03	0.0	40	21.0	19.0	2,200,000	57,000
Nov. 1	Nov. 2	-----	222.0	172.0	50.0	31.0	----	----	24.0	0.00	0.0	56	39.0	17.0	1,900,000	52,000
Nov. 3	Nov. 4	16.0	158.0	136.0	22.0	20.0	----	----	28.0	0.00	0.0	68	57.0	11.0	1,700,000	--------
Nov. 15	Nov. 16	14.0	120.0	100.0	20.0	29.0	----	----	26.0	0.10	0.1	51	34.0	17.0	2,500,000	59,500
Nov. 17	Nov. 18	14.0	174.0	136.0	38.0	20.0	----	----	25.0	0.18	0.1	44	26.0	18.0	2,400,000	52,500
Nov. 21	Nov. 22	15.0	200.0	176.0	24.0	24.0	----	----	24.0	0.10	0.0	45	24.0	21.0	1,700,000	66,500
Nov. 23	Nov. 24	-----	260.0	200.0	60.0	9.0	----	----	19.0	0.00	0.0	30	13.0	17.0	2,500,000	168,500
Nov. 25	Nov. 26	14.0	120.0	112.0	8.0	19.0	----	----	13.0	0.30	4.0	42	31.0	11.0	1,900,000	122,000
Nov. 29	----- --	14.0	114.0	106.0	8.0	20.0	----	----	21.0	0.20	1.5	56	43.0	13.0	----------	52,000
Dec. 3	Dec. 4	13.0	122.0	108.0	14.0	19.0	----	----	23.0	0.20	1.0	84	69.0	15.0	1,500,000	67,000
Dec. 5	Dec. 6	12.5	120.0	96.0	24.0	25.0	----	----	21.0	0.13	1.0	49	40.0	9.0	1,700,000	69,000
Dec. 7	Dec. 8	-----	176.0	148.0	28.0	20.0	----	----	23.0	0.03	0.0	44	31.0	13.0	----------	69,500
Dec. 11	Dec. 12	12.2	128.0	120.0	8.0	16.0	----	----	24.0	0.08	0.0	46	30.0	16.0	1,800,000	102,000
Dec. 13	Dec. 14	12.0	112.0	86.0	26.0	22.0	----	----	17.0	0.18	5.0	41	25.0	16.0	1,600,000	66,500
Dec. 15	Dec. 16	12.0	126.0	108.0	18.0	21.0	----	----	15.0	0.18	3.0	53	32.0	21.0	----------	92,000
Dec. 20	Dec. 21	11.0	85.0	75.0	10.0	23.0	21.0	2.0	15.0	0.13	2.0	48	33.0	15.0	2,400,000	--------
Dec. 22	Dec. 23	-----	148.0	102.0	46.0	17.0	10.0	7.0	15.0	0.20	0.0	45	18.0	27.0	----------	--------
Dec. 26	Dec. 27	12.0	102.0	94.0	8.0	22.0	17.0	5.0	18.0	0.20	0.0	54	24.0	30.0	2,300,000	84,000
Dec. 28	Dec. 29	12.0	110.0	102.0	8.0	19.0	17.0	2.0	19.0	0.00	0.0	47	13.0	34.0	1,300,000	82,000
Jan. 6	Jan. 9	10.9	96.5	80.5	16.0	17.0	13.0	4.0	16.0	0.07	1.3	47	27.0	20.0	1,700,000	108,500
Jan. 9	Jan. 12	10.0	101.0	83.0	18.0	13.0	7.5	5.5	15.0	0.14	2.3	34	16.0	18.0	2,700,000	105,500
Jan. 15	Jan. 18	10.0	101.0	94.0	7.0	22.0	19.0	3.0	13.0	0.18	2.3	61	31.0	30.0	4,300,000	84,000
Jan. 18	Jan. 21	10.3	151.0	139.0	12.0	25.0	19.0	6.0	19.0	0.12	1.3	77	45.0	32.0	3,000,000	77,000
Jan. 25	Jan. 27	10.0	151.0	128.0	23.0	14.0	8.0	6.0	15.0	0.25	0.1	35	17.0	18.0	1,400,000	88,000

TABLE No. 1—*Concluded.*

PERIOD COVERED 1908		TEMP. DEGREES CENT.	PARTS PER MILLION												BACTERIA per C. C.	Rate of Flow, Gallons per 24 Hours
			SUSP. SOLIDS			NITROGEN AS						OXYGEN CONSUMED				
						ORGANIC										
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates	Total	Dissolved	Suspended		
RAW SEWAGE.																
Jan. 28	Jan. 30	9.8	220.0	196.0	24.0	21.0	17.0	4.0	17.0	0.10	1.2	72	48.0	24.0	1,900,000	74,500
Feb. 2	Feb. 5	9.2	133.0	111.0	22.0	19.0	14.0	5.0	19.0	0.15	1.4	86	68.0	18.0	1,100,000	75,000
Feb. 5	Feb. 8	8.7	105.0	90.0	15.0	21.0	15.0	6.0	17.0	0.18	1.5	74	40.0	34.0	2,100,000	78,000
Feb. 11	Feb. 14	8.0	187.0	126.0	61.0	20.0	11.0	9.0	16.0	0.17	1.5	79	57.0	22.0	4,200,000	104,000
Feb. 14	Feb. 17	8.6	132.0	111.0	21.0	22.0	16.0	6.0	15.0	0.13	2.3	63	42.0	21.0	1,400,000	92,500
Feb. 20	Feb. 23	8.2	105.0	86.5	18.5	20.0	17.0	3.0	13.0	0.10	1.8	60	44.0	16.0	1,300,000	79,000
Feb. 23	Feb. 26	9.1	230.0	176.0	54.0	14.0	11.0	3.0	19.0	0.08	2.0	84	59.0	25.0	3,000,000	131,500
Feb. 29	Mar. 3	9.5	314.0	280.0	34.0	23.0	18.0	5.0	22.0	0.13	1.2	114	60.0	54.0	1,700,000	82,500
Mar. 3	Mar. 6	8.9	377.0	317.0	60.0	27.0	19.0	8.0	18.0	0.18	1.4	111	50.0	61.0	1,700,000	89,500
Mar. 9	Mar. 12	9.1	241.0	204.0	37.0	30.0	20.0	10.0	19.0	0.18	1.8	100	45.0	55.0	2,400,000	87,000
Mar. 12	Mar. 15	9.5	244.0	212.0	32.0	28.0	21.0	7.0	20.0	0.12	3.0	98	28.0	70.0	2,300,000	80,000
Mar. 18	Mar. 24	10.1	198.0	166.0	32.0	30.0	23.0	7.0	20.0	0.13	2.0	91	21.0	70.0	2,800,000	77,500
Mar. 27	April 11	11.4	175.0	140.0	35.0	30.0	24.0	6.0	19.0	0.35	2.0	62	22.0	40.0	[illegible]	[illegible]
April 14	April 29	12.9	155.0	129.0	26.0	20.0	15.0	5.0	21.0	0.05	1.0	62	19.0	43.0	2,400,000	94,000
April 30	May 7	13.6	111.0	89.0	22.0	18.0	16.0	2.0	19.0	0.10	10.0	73	60.0	13.0	3,000,000	95,700
May 25	May 26	17.0	96.0	91.0	5.0	19.0	15.0	4.0	14.0	0.03	0.5	130	64.0	66.0	----------	--------
June 8	June 13	18.6	80.0	66.0	14.0	16.0	15.0	1.0	15.0	0.05	0.5	55	36.0	19.0	2,000,000	64,000
June 15	June 27	19.6	110.0	93.0	17.0	17.0	13.0	4.0	15.0	0.05	2.0	52	30.0	22.0	1,600,000	68,200
June 29	July 11	20.9	74.0	64.0	10.0	12.0	11.0	1.0	13.0	0.08	0.5	59	24.0	35.0	3,900,000	77,600
July 13	July 25	21.7	144.0	109.0	35.0	10.0	8.0	2.0	14.0	0.05	1.0	45	16.0	29.0	3,800,000	92,000
July 27	Aug. 8	21.9	104.0	85.0	19.0	9.0	5.0	4.0	13.0	0.03	1.0	45	16.0	29.0	6,600,000	79,300
Aug. 10	Aug. 22	22.1	94.0	84.0	10.0	11.0	7.0	4.0	14.0	0.05	0.4	47	29.0	18.0	2,300,000	--------
Aug. 24	Sept. 5	20.7	110.0	90.0	20.0	12.0	9.0	3.0	16.0	0.10	1.0	50	20.0	30.0	3,800,000	67,500
Sept. 7	Sept. 19	19.7	97.0	85.0	12.0	14.0	11.0	3.0	18.0	0.10	0.2	51	28.0	23.0	5,300,000	--------
Sept. 21	Oct. 3	19.5	105.0	87.0	18.0	13.0	10.0	3.0	19.0	0.10	0.2	66	38.0	28.0	6,700,000	83,700
Oct. 5	Oct. 17	17.8	109.0	90.0	19.0	10.0	5.0	5.0	23.0	0.05	1.0	57	38.0	19.0	6,400,000	76,700

TABLE No. 2.

Period Covered 1907-8		Temp. Degrees Cent.	Parts per Million												Bacteria per C. C.	Hours Detention in Tank
			Susp'd Solids			Nitrogen as						Oxygen Consumed				
						Organic										
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates	Total	Dissolved	Suspended		
Settled Sewage.																
Aug. 1	Aug. 2	-----	38.0	26.0	12.0	6.0	6.0	0.0	14.0	0.60	2.0	24	23.0	1.0	----------	25.0
Aug. 3	Aug. 4	-----	36.0	33.0	3.0	7.0	2.0	5.0	14.0	0.30	1.0	29	15.0	14.0	----------	------
Aug. 5	Aug. 6	-----	26.0	21.0	5.0	12.0	7.0	5.0	18.0	0.15	0.3	32	30.0	2.0	6,500,000	24.8
Aug. 9	Aug. 10	-----	29.5	15.5	14.0	22.0	7.0	15.0	13.0	0.85	3.0	23	-----	----	3,900,000	16.8
Aug. 11	Aug. 12	-----	48.0	42.5	5.5	5.0	2.0	3.0	22.0	0.00	0.2	22	7.0	15.0	3,100,000	22.4
Aug. 13	Aug. 14	-----	23.0	16.0	7.0	13.0	12.0	1.0	21.0	0.30	0.3	27	27.0	0.0	2,200,000	20.3
Aug. 19	Aug. 20	19.0	51.0	31.0	20.0	20.0	20.0	0.0	20.0	0.60	0.5	35	33.0	2.0	1,800,000	17.3
Aug. 21	Aug. 22	18.5	69.0	40.0	29.0	10.0	9.0	1.0	23.0	1.20	1.5	35	32.0	3.0	2,000,000	21.8
Aug. 23	Aug. 24	18.5	71.0	42.0	29.0	9.0	4.0	5.0	20.0	0.30	3.0	19	18.0	1.0	1,700,000	9.4
Aug. 27	Aug. 28	19.0	81.0	57.0	24.0	13.0	11.0	2.0	23.0	0.18	0.1	43	40.0	3.0	2,800,000	23.0
Aug. 29	Aug. 30	19.0	46.0	33.0	13.0	15.0	14.0	1.0	25.0	0.03	0.1	41	40.0	1.0	2,400,000	20.8
Aug. 31	Sept. 1	19.0	37.0	30.0	7.0	16.0	13.0	3.0	23.0	0.30	1.0	39	17.0	22.0	----------	11.3
Sept. 4	Sept. 5	20.5	34.0	22.0	12.0	15.0	14.0	1.0	21.0	0.15	0.0	48	47.0	1.0	----------	15.6
Sept. 6	Sept. 7	19.5	52.0	38.0	14.0	12.0	9.0	3.0	25.0	0.18	0.1	51	49.0	2.0	----------	9.3
Sept. 8	Sept. 9	22.0	131.0	63.0	68.0	12.0	9.0	3.0	21.0	0.03	0.0	34	27.0	7.0	----------	9.5
Sept. 14	Sept. 15	-----	70.0	66.0	4.0	14.0	13.0	1.0	25.0	0.10	0.0	38	32.0	6.0	----------	9.0
Sept. 16	Sept. 17	22.0	98.0	76.0	22.0	17.0	15.0	2.0	22.0	0.10	0.0	40	16.0	30.0	----------	7.5
Sept. 20	Sept. 21	20.0	68.0	53.0	15.0	18.0	15.0	3.0	18.0	0.30	0.0	40	32.0	8.0	3,100,000	9.1
Sept. 22	Sept. 23	-----	126.0	68.0	58.0	19.0	14.0	5.0	19.0	2.40	3.0	16	5.0	11.0	----------	8.1
Sept. 24	Sept. 25	20.5	71.0	50.0	21.0	23.0	22.0	1.0	11.0	0.33	0.5	30	24.0	6.0	1,800,000	5.5
Sept. 28	Sept. 29	-----	30.0	30.0	0.0	18.0	16.0	2.0	16.0	1.30	3.0	22	8.0	14.0	1,700,000	3.4
Sept. 30	Oct. 1	19.5	26.0	23.0	3.0	25.0	17.0	8.0	16.0	0.45	0.0	40	13.0	27.0	1,600,00	7.0
Oct. 2	Oct. 3	19.0	84.0	65.0	19.0	17.0	12.0	5.0	24.0	0.00	0.0	31	22.0	9.0	----------	6.8
Oct. 6	Oct. 7	19.0	95.0	70.0	25.0	16.0	15.0	1.0	24.0	0.00	0.0	50	45.0	5.0	1,900,000	10.3
Oct. 8	Oct. 9	19.0	91.0	71.0	20.0	14.0	11.0	3.0	23.0	0.10	0.0	45	30.0	15.0	2,400,000	15.4
Oct. 10	Oct. 11	18.0	112.0	80.0	32.0	14.0	10.0	4.0	28.0	0.20	0.3	44	15.0	29.0	1,100,000	9.4
Oct. 21	---- --	-----	First Compartment of Settling Tank Emptied.													
Oct. 22	Oct. 23	17.0	92.0	76.0	16.0	18.0	----	----	22.0	0.03	0.0	55	39.0	16.0	----------	11.8
Oct. 24	Oct. 25	16.0	72.0	54.0	18.0	17.0	----	----	25.0	0.05	0.0	38	29.0	9.0	1,400,000	------
Oct. 26	Oct. 27	-----	88.0	64.0	24.0	21.0	----	----	25.0	0.15	0.8	41	24.0	17.0	----------	9.8
Oct. 30	Oct. 31	-----	96.0	74.0	22.0	22.0	----	----	27.0	0.00	0.1	25	16.0	9.0	1,800,000	7.9
Nov. 1	Nov. 2	-----	102.0	76.0	26.0	18.0	----	----	26.0	0.30	0.6	43	35.0	8.0	1,700,000	8.2
Nov. 3	Nov. 4	16.0	92.0	62.0	30.0	18.0	----	----	26.0	0.15	0.1	74	62.0	12.0	2,500,000	------
Nov. 15	Nov. 16	14.0	100.0	56.0	44.0	21.0	----	----	26.0	0.20	0.3	51	43.0	8.0	1,700,000	7.5
Nov. 17	Nov. 18	14.0	128.0	90.0	38.0	16.0	----	----	26.0	0.05	0.0	40	26.0	14.0	2,100,000	8.5
Nov. 21	Nov. 22	14.0	104.0	82.0	22.0	19.0	----	----	24.0	0.05	0.0	30	19.0	11.0	1,800,000	6.6
Nov. 23	Nov. 24	-----	122.0	80.0	42.0	12.0	----	----	15.0	0.00	0.0	23	11.0	12.0	1,000,000	3.8
Nov. 25	Nov. 26	13.5	76.0	50.0	26.0	20.0	----	----	13.0	0.30	3.0	39	32.0	7.0	700,000	4.0
Nov. 29	----- --	13.0	80.0	66.0	14.0	18.0	----	----	22.0	0.22	2.0	53	39.0	14.0	----------	8.5
Dec. 3	Dec. 4	12.0	94.0	74.0	20.0	18.0	----	----	27.0	0.15	1.0	74	61.0	13.0	1,500,000	6.8
Dec. 5	Dec. 6	11.5	134.0	88.0	46.0	24.0	----	----	24.0	0.18	0.0	82	56.0	26.0	1,900,000	6.5
Dec. 7	Dec. 8	-----	96.0	74.0	22.0	21.0	----	----	27.0	0.03	0.0	36	22.0	14.0	----------	6.3
Dec. 11	Dec. 12	10.5	86.0	72.0	14.0	18.0	----	----	20.0	0.15	2.0	47	19.0	28.0	1,700,000	4.6
Dec. 13	Dec. 14	9.0	54.0	40.0	14.0	19.0	----	----	19.0	0.18	5.0	40	27.0	13.0	1,900,000	6.7
Dec. 15	Dec. 16	9.0	60.0	44.0	16.0	20.0	----	----	16.0	0.33	6.0	51	38.0	13.0	----------	5.3
Dec. 20	Dec. 21	9.0	54.0	47.0	7.0	20.0	17.0	3.0	18.0	0.18	2.0	58	48.0	10.0	1,200,000	------
Dec. 22	Dec. 23	-----	83.0	52.0	31.0	13.0	12.0	1.0	15.0	0.28	1.5	50	29.0	21.0	----------	------
Dec. 26	Dec. 27	12.0	72.0	66.0	6.0	23.0	17.0	6.0	19.0	0.20	0.0	44	24.0	20.0	1,500,000	5.3
Dec. 28	Dec. 29	12.0	74.0	69.0	5.0	15.0	13.0	2.0	20.0	0.15	0.0	34	15.0	19.0	1,900,000	5.4
Jan. 6	Jan. 9	11.0	61.0	46.5	14.5	14.0	11.0	3.0	16.0	0.08	0.8	39	31.0	8.0	1,200,000	4.3
Jan. 9	Jan. 12	10.0	63.0	50.5	12.5	12.0	7.5	4.5	16.0	0.14	1.9	37	26.0	11.0	1,300,000	4.8
Jan. 15	Jan. 18	10.0	67.0	60.5	6.5	19.0	14.0	5.0	17.0	0.23	1.8	51	36.0	15.0	2,200,000	5.1
Jan. 18	Jan. 21	10.0	101.0	84.5	16.5	19.0	15.0	4.0	20.0	0.09	1.3	68	57.0	11.0	1,100,000	5.7

TABLE No. 2—*Concluded.*

PERIOD COVERED 1908		TEMP. DEGREES CENT.	PARTS PER MILLION												BACTERIA PER C. C.	HOURS DETENTION IN TANK
			SUSP'D SOLIDS			NITROGEN AS						OXYGEN CONSUMED				
						ORGANIC										
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates	Total	Dissolved	Suspended		
							SETTLED SEWAGE.									
Jan. 25	Jan. 27	10.0	60.0	50.0	10.0	17.0	13.0	4.0	14.0	0.15	1.0	31	19.0	12.0	1,100,000	5.1
Jan. 28	Jan. 30	9.2	54.0	46.0	8.0	17.0	15.0	2.0	13.0	0.10	1.0	54	47.0	7.0	1,100,000	6.1
Feb. 2	Feb. 5	8.9	67.5	58.5	9.0	16.0	15.0	1.0	18.0	0.15	1.4	73	63.0	10.0	1,300,000	6.0
Feb. 5	Feb. 8	8.6	52.5	43.0	9.5	18.0	15.0	3.0	17.0	0.10	1.4	66	59.0	7.0	900,000	5.8
Feb. 11	Feb. 14	7.9	63.0	39.5	23.5	15.0	14.0	1.0	13.0	0.12	1.5	53	41.0	12.0	1,400,000	4.3
Feb. 14	Feb. 17	8.8	62.0	48.0	14.0	18.0	15.0	3.0	15.0	0.13	2.0	57	37.0	20.0	900,000	4.8
Feb. 20	Feb. 23	8.5	68.0	55.5	12.5	18.0	14.0	4.0	14.0	0.13	1.5	54	50.0	4.0	800,000	5.8
Feb. 23	Feb. 26	8.7	84.5	60.0	24.5	16.0	13.0	3.0	16.0	0.09	1.8	61	52.0	9.0	600,000	4.4
Feb. 29	Mar. 3	9.3	76.0	71.5	4.5	15.0	13.0	2.0	19.0	0.13	1.4	66	55.0	11.0	1,000,000	5.4
Mar. 3	Mar. [illegible]	9.0	81.0	70.5	10.5	14.0	11.0	3.0	17.0	0.15	1.4	61	49.0	12.0	1,100,000	5.1
Mar. 9	Mar. 12	8.8	73.5	61.5	12.0	16.0	12.0	4.0	18.0	0.12	1.4	64	51.0	13.0	1,100,000	5.1
Mar. 12	Mar. 15	9.0	51.5	50.5	1.0	16.0	12.0	4.0	17.0	0.13	3.0	51	27.0	24.0	700,000	5.6
Mar. 18	Mar. 24	9.6	58.0	50.5	7.5	17.0	15.0	2.0	17.0	0.12	2.0	49	26.0	23.0	1,400,000	5.7
Mar. 27	April 11	11.3	75.5	64.0	11.5	22.0	19.0	3.0	19.0	0.20	1.0	60	38.0	22.0	1,800,000	5.4
April 14	April 29	13.1	104.0	90.0	14.0	16.0	13.0	3.0	22.0	0.05	1.0	57	35.0	22.0	500,000	5.4
April 30	May 7	13.3	53.0	41.0	12.0	15.0	13.0	2.0	21.0	0.10	1.0	59	51.0	8.0	1,500,000	5.2
May 25	May 26	17.0	116.0	107.0	9.0	15.0	12.0	3.0	18.0	0.05	0.5	120	72.0	48.0	----------	------
June 8	June 13	18.7	49.0	41.0	8.0	14.0	13.0	1.0	16.0	0.03	0.5	49	33.0	16.0	1,800,000	7.9
June 15	June 27	19.4	51.0	44.0	7.0	13.0	11.0	2.0	16.0	0.03	1.0	44	38.0	6.0	1,300,000	7.4
June 29	July 11	20.6	63.0	60.0	3.0	10.0	9.0	1.0	15.0	0.03	0.5	37	20.0	17.0	2,100,000	6.5
July 13	July 25	21.7	52.0	52.0	0.0	8.0	6.0	2.0	16.0	0.03	1.0	35	21.0	14.0	2,900,000	5.6
July 27	Aug. 8	21.9	65.0	53.0	12.0	8.0	5.0	3.0	15.0	0.10	1.0	30	15.0	15.0	4,400,000	6.6
Aug. 10	Aug. 22	22.2	59.0	44.0	15.0	8.0	6.0	2.0	17.0	0.05	0.4	33	29.0	4.0	2,900,000	------
Aug. 24	Sept. 5	20.6	74.0	58.0	16.0	9.0	8.0	1.0	19.0	0.05	1.0	43	23.0	20.0	2,200,000	7.5
Sept. 7	Sept. 19	19.7	68.0	58.0	10.0	12.0	9.0	3.0	21.0	0.05	0.2	40	26.0	14.0	2,500,000	7.6
Sept. 21	Oct. 3	19.5	42.0	35.0	7.0	19.0	17.0	2.0	20.0	0.00	0.0	41	34.0	7.0	2,300,000	6.0
Oct. 5	Oct. 17	17.7	51.0	41.0	10.0	8.0	5.0	3.0	25.0	0.05	1.0	45	32.0	13.0	4,100,000	6.7

TABLE No. 3.

PERIOD COVERED 1907-8		TEMP. DEGREES CENT.	PARTS PER MILLION										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
From	To		SUSP'D SOLIDS			NITROGEN AS						Oxygen Consumed		
			Total	Loss on Ignition	Fixed	ORGANIC			Free Ammonia	Nitrites	Nitrates			
						Total	Dissol'd	Susp.						
EFFLUENT FROM SIX-FOOT SPRINKLING FILTER ½" TO 1½" STONE.														
Aug. 1	Aug. 2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	---------	1.5
Aug. 3	Aug. 4	-----	26.0	17.0	9.0	19.0	17.0	2.0	13.0	1.00	4.0	8.0	---------	1.5
Aug. 5	Aug. 6	-----	32.5	7.5	25.0	7.0	7.0	0.0	11.0	1.40	5.0	18.0	420,000	1.5
Aug. 9	Aug. 10	-----	17.2	6.4	10.8	17.0	14.0	3.0	7.0	1.50	15.0	15.0	740,000	2.0
Aug. 11	Aug. 12	-----	38.8	22.0	16.8	-----	15.0	-----	7.0	1.50	15.0	11.0	160,000	1.7
Aug. 13	Aug. 14	-----	53.0	23.0	30.0	9.0	8.0	1.0	7.0	2.75	15.0	17.0	250,000	1.8
Aug. 19	Aug. 20	20.5	12.4	7.2	5.2	14.0	12.0	2.0	6.0	2.75	15.0	16.0	110,000	1.9
Aug. 21	Aug. 22	21.5	28.8	13.6	15.2	5.0	2.0	3.0	10.0	3.00	25.0	16.0	100,000	1.8
Aug. 23	Aug. 24	19.5	28.0	18.0	10.0	13.0	11.0	2.0	5.5	1.70	25.0	13.0	180,000	2.3
Aug. 27	Aug. 28	20.0	24.4	14.4	10.0	3.0	1.0	2.0	10.0	1.40	20.0	14.0	260,000	1.6
Aug. 29	Aug. 30	20.5	18.4	10.4	8.0	12.0	10.0	2.0	8.0	1.80	15.0	12.0	100,000	1.8
Aug. 31	Sept. 1	20.0	14.4	10.4	4.0	9.0	7.0	2.0	10.0	1.50	16.0	17.0	---------	2.6
Sept. 4	Sept. 5	22.5	60.0	39.0	21.0	10.0	9.0	1.0	11.0	1.40	10.0	23.0	---------	2.8
Sept. 6	Sept. 7	20.5	18.8	17.6	1.2	7.0	7.0	0.0	11.0	1.30	10.0	17.0	---------	3.1
Sept. 8	Sept. 9	22.0	52.0	30.8	21.2	7.0	7.0	0.0	13.0	0.90	10.0	20.0	---------	3.1
Sept. 14	Sept. 15	-----	24.0	12.0	12.0	10.0	10.0	0.0	13.0	1.70	10.0	14.0	---------	3.4
Sept. 16	Sept. 17	22.5	22.0	13.2	8.8	8.0	6.0	2.0	14.0	0.80	8.0	21.0	---------	3.5
Filter rested from September 20 to October 21, inclusive.														
Oct. 22	Oct. 23	15.5	78.0	56.0	22.0	15.0	-----	-----	18.0	0.10	0.0	30.0	---------	3.0
Oct. 24	Oct. 25	15.0	10.0	8.0	2.0	19.0	-----	-----	21.0	0.40	0.0	13.0	180,000	------
Oct. 26	Oct. 27	-----	10.0	10.0	0.0	13.0	-----	-----	23.0	0.10	3.0	13.0	---------	4.3
Filter rested from October 30 to November 6, and November 16 to 20, inclusive.														
Nov. 21	Nov. 22	14.0	76.0	40.0	36.0	15.0	-----	-----	17.0	1.00	10.0	19.0	200,000	2.3
Nov. 23	Nov. 24	-----	42.0	34.0	8.0	8.0	-----	-----	12.0	0.90	10.0	11.0	160,000	4.0
Nov. 25	Nov. 26	12.5	36.0	22.0	14.0	11.0	-----	-----	12.0	0.80	10.0	19.0	140,000	4.0
Filter rested from November 29 to December 2, inclusive.														
Dec. 3	Dec. 4	9.0	94.0	54.0	40.0	11.0	-----	-----	19.0	0.40	10.0	26.0	90,000	2.7
Dec. 5	Dec. 6	9.5	52.0	26.0	26.0	12.0	-----	-----	16.0	0.40	10.0	15.0	150,000	2.6
Dec. 7	Dec. 8	-----	36.0	26.0	10.0	9.0	-----	-----	15.0	0.50	15.0	14.0	---------	2.8
Dec. 20	Dec. 21	9.0	38.0	22.0	16.0	9.0	8.0	1.0	13.0	0.40	15.0	17.0	240,000	------
Dec. 22	Dec. 23	-----	68.0	34.0	34.0	9.0	7.0	2.0	12.0	0.40	10.0	23.0	---------	------
Dec. 26	Dec. 27	10.5	46.0	31.0	15.0	10.0	7.0	3.0	14.0	1.00	8.0	21.0	240,000	3.4
Dec. 28	Dec. 29	11.0	60.0	34.0	26.0	13.0	11.0	2.0	13.0	0.20	8.0	23.0	---------	2.8
Jan. 7	Jan. 9	8.7	71.0	45.0	26.0	10.0	6.0	4.0	12.0	0.80	7.0	22.0	160,000	4.6
Jan. 10	Jan. 12	9.0	50.0	41.0	9.0	7.0	6.0	1.0	11.0	0.40	8.0	22.0	110,000	3.9
Jan. 15	Jan. 17	9.0	36.0	34.0	2.0	8.0	7.0	1.0	12.0	1.30	9.0	21.0	530,000	3.5
Jan. 18	Jan. 20	9.0	34.0	25.0	9.0	6.0	4.0	2.0	16.0	0.05	9.0	26.0	710,000	3.2
Jan. 25	Jan. 27	4.3	50.0	44.0	6.0	8.0	4.0	4.0	14.0	0.50	7.0	17.0	180,000	3.8
Jan. 28	Jan. 30	5.7	52.0	34.0	18.0	8.0	7.0	1.0	14.0	0.20	10.0	24.0	130,000	3.0
Feb. 2	Feb. 4	6.0	60.0	46.0	14.0	7.0	6.0	1.0	13.0	0.10	10.0	35.0	710,000	3.8
Feb. 5	Feb. 7	5.8	30.0	26.0	4.0	9.0	7.0	2.0	15.0	0.20	12.0	27.0	1,400,000	3.2
Feb. 11	Feb. 13	7.3	68.0	46.0	22.0	12.0	7.0	5.0	11.0	0.30	10.0	25.0	180,000	4.1
Feb. 14	Feb. 16	8.8	60.0	40.0	20.0	11.0	9.0	2.0	11.0	0.05	10.0	21.0	170,000	4.3
Feb. 20	Feb. 22	7.3	64.0	48.0	16.0	10.0	8.0	2.0	12.0	0.20	10.0	23.0	280,000	3.1
Feb. 23	Feb. 25	7.8	40.0	36.0	4.0	7.0	6.0	1.0	15.0	0.10	10.0	27.0	---------	3.3
Mar. 1	Mar. 3	8.0	28.0	22.0	6.0	12.0	9.0	3.0	10.0	0.10	10.0	21.0	110,000	3.3
Mar. 4	Mar. 6	7.5	27.0	23.0	4.0	6.0	5.0	1.0	11.0	0.10	10.0	20.0	220,000	3.7
Mar. 9	Mar. 11	7.8	47.0	33.0	14.0	10.0	7.0	3.0	12.0	0.20	12.0	23.0	450,000	3.5
Mar. 12	Mar. 14	9.0	56.0	46.0	10.0	9.0	8.0	1.0	12.0	0.10	20.0	21.0	850,000	3.3
Mar. 19	Mar. 24	9.5	48.0	37.0	11.0	8.0	6.0	2.0	15.0	0.60	15.0	20.0	220,000	3.1
Mar. 27	April 11	11.4	36.0	26.0	10.0	10.0	8.0	2.0	14.0	0.05	12.0	19.0	590,000	3.6
April 14	April 29	13.0	70.0	47.0	23.0	12.0	10.0	2.0	15.0	0.10	7.0	28.0	380,000	5.3
April 30	May 7	13.9	63.0	47.0	16.0	14.0	10.0	4.0	16.0	0.10	10.0	33.0	460,000	5.3

TABLE No. 4.

Period Covered 1907-8		Temp. Degrees Cent.	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			Susp'd Solids			Nitrogen as						Oxygen Consumed		
						Organic			Free Ammonia	Nitrites	Nitrates			
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.						
Settled Effluent from Six-foot Sprinkling Filter ½″ to 1½″ Stone.														
Aug. 1	Aug. 2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	---------	1.5
Aug. 3	Aug. 4	-----	-----	-----	-----	21.0	19.0	2.0	12.0	-----	-----	6.0	---------	1.5
Aug. 5	Aug. 6	-----	13.6	2.8	10.8	9.0	7.0	2.0	-----	-----	-----	18.0	530,000	1.5
Aug. 9	Aug. 10	-----	9.4	3.4	6.0	16.0	15.0	1.0	7.0	1.60	15.0	17.0	300,000	2.0
Aug. 11	Aug. 12	-----	2.0	2.0	0.0	5.0	5.0	0.0	8.0	1.50	15.0	10.0	200,000	1.7
Aug. 13	Aug. 14	-----	4.0	2.8	1.2	7.5	7.5	0.0	7.5	2.75	15.0	11.0	240,000	1.8
Aug. 19	Aug. 20	20.5	5.2	4.4	0.8	14.0	14.0	0.0	5.0	2.70	15.0	14.0	110,000	1.9
Aug. 21	Aug. 22	21.5	10.0	5.6	4.4	4.5	4.5	0.0	9.5	3.25	25.0	12.0	130,000	1.8
Aug. 23	Aug. 24	19.5	9.2	7.2	2.0	8.0	7.0	1.0	9.0	1.80	20.0	12.0	90,000	2.3
Aug. 27	Aug. 28	20.0	14.4	7.2	7.2	3.0	2.0	1.0	11.0	1.50	15.0	15.0	200,000	1.6
Aug. 29	Aug. 30	20.5	6.8	5.6	1.2	12.0	8.5	3.5	8.5	1.80	15.0	13.0	120,000	1.8
Aug. 31	Sept. 1	20.0	8.4	5.6	2.8	9.0	7.0	2.0	11.0	1.75	16.0	16.0	---------	2.6
Sept. 4	Sept. 5	22.5	20.0	16.0	4.0	8.0	7.0	1.0	11.0	1.20	10.0	22.0	---------	2.8
Sept. 6	Sept. 7	20.5	13.2	12.4	0.8	9.0	7.0	2.0	11.0	1.40	10.0	15.0	---------	3.1
Sept. 8	Sept. 9	22.0	17.2	12.4	4.8	7.0	7.0	0.0	14.0	1.10	10.0	19.0	---------	3.1
Sept. 14	Sept. 15	-----	13.6	7.2	6.4	10.0	10.0	0.0	14.0	1.80	8.0	13.0	---------	3.4
Sept. 16	Sept. 17	22.5	12.8	8.4	4.4	10.0	10.0	0.0	14.0	0.70	8.0	18.0	---------	3.5
Filter rested from September 20 to October 21, inclusive.														
Oct. 22	Oct. 23	15.5	74.0	60.0	14.0	13.0	-----	-----	21.0	0.10	8.0	30.0	---------	3.0
Oct. 24	Oct. 25	15.0	9.0	9.0	0.0	18.0	-----	-----	21.0	0.10	0.0	16.0	180,000	-------
Oct. 26	Oct. 27	-----	4.0	4.0	0.0	9.0	-----	-----	23.0	0.20	2.0	12.0	---------	4.3
Filter rested from October 30 to November 6, and November 16 to 20, inclusive.														
Nov. 21	Nov. 22	14.0	34.0	18.0	16.0	13.0	-----	-----	17.0	1.00	9.0	13.0	180,000	2.3
Nov. 23	Nov. 24	-----	26.0	20.0	6.0	7.0	-----	-----	12.0	0.90	10.0	10.0	140,000	4.0
Nov. 25	Nov. 26	12.5	20.0	16.0	4.0	10.0	-----	-----	11.0	1.20	10.0	13.0	130,000	4.0
Filter rested from November 29 to December 2, inclusive.														
Dec. 3	Dec. 4	9.0	44.0	26.0	18.0	9.0	-----	-----	19.0	0.40	10.0	20.0	90,000	2.7
Dec. 5	Dec. 6	9.5	30.0	14.0	16.0	9.0	-----	-----	16.0	0.40	9.0	18.0	160,000	2.6
Dec. 7	Dec. 8	-----	18.0	16.0	2.0	9.0	-----	-----	15.0	0.20	15.0	11.0	---------	2.8
Dec. 20	Dec. 21	9.0	21.0	14.0	7.0	9.0	8.0	1.0	13.0	0.40	12.0	15.0	90,000	-------
Dec. 22	Dec. 23	-----	56.0	49.0	7.0	11.0	5.0	6.0	12.0	0.00	10.0	19.0	---------	-------
Dec. 26	Dec. 27	10.5	19.0	12.0	7.0	9.0	7.0	2.0	14.0	0.60	7.0	16.0	190,000	3.4
Dec. 28	Dec. 29	11.0	32.0	19.0	13.0	13.0	12.0	1.0	13.0	0.20	7.0	20.0	180,000	2.8
Jan. 7	Jan. 9	8.7	43.0	25.0	18.0	8.0	6.0	2.0	12.0	0.70	7.0	15.0	110,000	4.6
Jan. 10	Jan. 12	9.0	42.0	28.0	14.0	6.0	4.0	2.0	11.0	0.50	8.0	16.0	60,000	3.9
Jan. 15	Jan. 17	9.0	22.0	21.0	1.0	7.0	2.0	5.0	14.0	1.30	9.0	20.0	90,000	3.5
Jan. 18	Jan. 20	9.0	34.0	23.0	11.0	7.0	6.0	1.0	15.0	0.05	8.0	24.0	100,000	3.2
Jan. 25	Jan. 27	4.3	40.0	32.0	8.0	7.0	3.0	4.0	15.0	0.10	7.0	14.0	200,000	3.8
Jan. 28	Jan. 30	5.7	64.0	44.0	20.0	9.0	6.0	3.0	13.0	0.50	10.0	21.0	100,000	3.0
Feb. 2	Feb. 4	6.0	38.0	28.0	10.0	6.0	5.0	1.0	14.0	0.10	10.0	30.0	580,000	3.8
Feb. 5	Feb. 7	5.8	24.0	20.0	4.0	10.0	8.0	2.0	14.0	0.20	12.0	26.0	250,000	3.2
Feb. 11	Feb. 13	7.3	38.0	24.0	14.0	10.0	9.0	1.0	12.0	0.30	10.0	19.0	120,000	4.1
Feb. 14	Feb. 16	8.8	26.0	20.0	6.0	10.0	10.0	0.0	11.0	0.05	8.0	18.0	90,000	4.3
Feb. 20	Feb. 22	7.3	32.0	24.0	8.0	8.0	7.0	1.0	13.0	0.40	10.0	20.0	90,000	3.1
Feb. 23	Feb. 25	7.8	26.0	24.0	2.0	7.0	6.0	1.0	15.0	0.10	8.0	25.0	160,000	3.3
Mar. 1	Mar. 3	8.0	20.0	15.0	5.0	12.0	11.0	1.0	10.0	0.10	10.0	19.0	110,000	3.3
Mar. 4	Mar. 6	7.5	20.0	15.0	5.0	5.0	4.0	1.0	12.0	0.10	10.0	18.0	160,000	3.7
Mar. 9	Mar. 11	7.8	22.5	15.0	7.5	11.0	10.0	1.0	11.0	0.20	10.0	20.0	120,000	3.5
Mar. 12	Mar. 14	9.0	21.0	16.5	4.5	9.0	8.0	1.0	12.0	0.10	15.0	18.0	110,000	3.3
Mar. 19	Mar. 24	9.5	25.0	16.0	9.0	7.0	6.0	1.0	15.0	0.30	10.0	19.0	120,000	3.1
Mar. 27	April 11	11.4	14.0	10.0	4.0	9.0	8.0	1.0	14.0	0.20	12.0	16.0	130,000	3.6
April 14	April 29	13.0	31.0	20.0	11.0	12.0	12.0	0.0	15.0	0.10	7.0	22.0	210,000	5.3
April 30	May 7	13.9	37.0	30.0	7.0	12.0	10.0	2.0	16.0	0.10	10.0	28.0	180,000	5.3

TABLE No. 5.

Period Covered 1907-8		Temp. Degrees Cent.	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			Susp'd Solids			Nitrogen as						Oxygen Consumed		
						Organic			Free Ammonia	Nitrites	Nitrates			
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.						
Effluent From Nine-foot Sprinkling Filter ½″ to 1½″ Stone.														
Aug. 1	Aug. 2	-----	65.0	30.0	35.0	7.5	3.5	4.0	13.0	0.50	5.0	12.0	---------	1.5
Aug. 3	Aug. 4	-----	4.0	4.0	0.0	26.0	19.0	7.0	9.5	0.80	6.0	7.0	---------	1.5
Aug. 5	Aug. 6	-----	4.6	0.0	4.6	7.5	6.5	1.0	8.5	1.60	8.0	13.0	220,000	1.5
Aug. 9	Aug. 10	-----	11.6	3.8	7.8	2.5	0.5	2.0	4.5	1.15	15.0	14.0	250,000	2.0
Aug. 11	Aug. 12	-----	16.8	8.8	8.0	13.0	12.0	1.0	8.5	1.00	15.0	6.0	190,000	1.7
Aug. 13	Aug. 14	-----	45.5	12.0	33.5	6.5	5.5	1.0	6.5	2.00	15.0	12.0	120,000	1.8
Aug. 19	Aug. 20	21.0	6.4	5.2	1.2	9.0	9.0	0.0	5.0	1.50	15.0	11.0	90,000	1.9
Aug. 21	Aug. 22	21.5	17.6	9.6	8.0	4.5	4.5	0.0	6.5	2.25	20.0	18.0	110,000	1.8
Aug. 23	Aug. 24	19.5	14.0	13.6	0.4	13.0	12.0	1.0	3.5	1.00	20.0	9.0	130,000	2.3
Aug. 27	Aug. 28	20.0	14.4	8.8	5.6	4.5	4.5	0.0	4.5	1.10	20.0	10.0	160,000	1.6
Aug. 29	Aug. 30	20.0	7.2	4.0	3.2	9.0	9.0	0.0	4.0	1.20	15.0	10.0	120,000	1.8
Aug. 31	Sept. 1	20.0	8.0	7.2	0.8	9.0	6.0	3.0	6.0	1.10	15.0	13.0	---------	2.6
Sept. 4	Sept. 5	22.5	40.0	30.0	10.0	7.0	6.0	1.0	7.0	1.20	20.0	17.0	---------	2.8
Sept. 6	Sept. 7	20.5	10.4	9.6	0.8	9.0	8.0	1.0	7.0	1.20	15.0	11.0	---------	3.1
Sept. 8	Sept. 9	21.0	33.6	19.2	14.4	7.0	6.0	1.0	13.0	1.00	10.0	15.0	---------	3.1
Sept. 14	Sept. 15	-----	31.6	12.0	19.6	11.0	11.0	0.0	9.5	1.90	15.0	11.0	---------	3.4
Sept. 16	Sept. 17	22.0	22.0	10.8	11.2	9.0	9.0	0.0	11.0	0.90	10.0	13.0	---------	3.5
Filter rested from September 20 to October 21, inclusive.														
Oct. 22	Oct. 23	14.5	94.0	52.0	42.0	15.0	-----	-----	18.0	1.60	6.0	24.0	---------	3.0
Oct. 24	Oct. 25	15.0	-----	-----	-----	12.0	-----	-----	20.0	0.10	1.0	12.0	190,000	-------
Oct. 26	Oct. 27	-----	5.0	3.0	2.0	13.0	-----	-----	21.0	0.50	4.0	10.0	---------	4.3
Filter rested from October 30 to November 6, and November 16 to 20, inclusive.														
Nov. 21	Nov. 22	13.0	76.0	36.0	40.0	13.0	-----	-----	15.0	1.30	15.0	14.0	180,000	2.3
Nov. 23	Nov. 24	-----	70.0	36.0	34.0	6.0	-----	-----	11.0	0.60	15.0	13.0	50,000	4.0
Nov. 25	Nov. 26	12.0	54.0	34.0	20.0	11.0	-----	-----	9.5	0.60	15.0	13.0	90,000	4.0
Filter rested from November 29 to December 2, inclusive.														
Dec. 3	Dec. 4	9.0	110.0	62.0	48.0	11.0	-----	-----	18.0	0.90	20.0	21.0	90,000	2.7
Dec. 5	Dec. 6	8.5	100.0	48.0	52.0	17.0	-----	-----	13.0	0.60	20.0	21.0	120,000	2.6
Dec. 7	Dec. 8	-----	98.0	48.0	50.0	11.0	-----	-----	11.0	0.60	20.0	12.0	---------	2.8
Dec. 20	Dec. 21	9.0	26.0	14.0	12.0	12.0	10.0	2.0	11.0	0.40	14.0	14.0	80,000	------
Dec. 22	Dec. 23	-----	65.0	32.0	33.0	9.5	7.5	2.0	8.5	0.40	12.0	13.0	---------	-------
Dec. 26	Dec. 27	10.5	32.0	19.0	13.0	8.0	7.0	1.0	12.0	0.60	15.0	13.0	150,000	3.4
Dec. 28	Dec. 29	11.0	33.0	19.0	14.0	13.0	12.0	1.0	10.0	0.20	15.0	12.0	140,000	2.8
Jan. 7	Jan. 9	7.7	47.0	28.0	18.0	13.0	6.5	6.5	8.5	0.60	10.0	11.0	100,000	4.6
Jan. 10	Jan. 12	8.0	53.0	42.0	11.0	8.0	4.0	4.0	9.0	0.50	10.0	10.0	240,000	3.9
Jan. 15	Jan. 17	9.0	58.0	46.0	12.0	11.0	7.0	4.0	9.0	1.30	12.0	16.0	120,000	3.5
Jan. 18	Jan. 20	9.0	61.0	40.0	21.0	8.0	6.0	2.0	13.0	0.05	12.0	22.0	260,000	3.2
Jan. 25	Jan. 27	4.0	80.0	52.0	28.0	9.0	4.0	5.0	11.0	0.40	12.0	15.0	190,000	3.8
Jan. 28	Jan. 30	5.5	58.0	39.0	19.0	8.0	5.0	3.0	9.0	0.70	15.0	16.0	100,000	3.0
Feb. 2	Feb. 4	5.5	43.0	31.0	12.0	5.5	4.5	1.0	8.5	0.20	15.0	23.0	230,000	3.8
Feb. 5	Feb. 7	5.5	43.0	32.0	11.0	7.0	5.0	2.0	12.0	0.20	18.0	21.0	70,000	3.2
Feb. 11	Feb. 13	7.0	44.0	26.0	18.0	12.0	9.5	2.5	7.5	0.30	12.0	15.0	120,000	4.7
Feb. 14	Feb. 16	8.5	28.0	22.0	6.0	11.0	9.0	2.0	10.0	0.05	10.0	20.0	130,000	4.3
Feb. 20	Feb. 22	7.0	44.0	32.0	12.0	10.0	9.0	1.0	6.0	0.10	12.0	16.0	70,000	3.7
Feb. 23	Feb. 25	7.5	30.0	22.0	8.0	9.0	6.0	3.0	11.0	0.10	12.0	18.0	80,000	3.3
Mar. 1	Mar. 3	8.0	17.0	10.5	6.5	10.0	7.0	3.0	8.0	0.05	15.0	14.0	80,000	3.3
Mar. 4	Mar. 6	7.5	30.0	23.0	7.0	6.5	4.5	2.0	6.5	0.05	12.0	16.0	90,000	3.7
Mar. 9	Mar. 11	8.3	36.0	22.0	14.0	15.0	8.0	7.0	7.0	0.20	15.0	17.0	130,000	3.5
Mar. 12	Mar. 14	9.2	40.0	34.0	6.0	8.0	7.0	1.0	7.0	0.30	25.0	17.0	200,000	3.3
Mar. 19	Mar. 24	9.7	58.0	41.0	17.0	8.5	7.5	1.0	8.5	0.40	20.0	18.0	140,000	3.1
Mar. 27	April 11	11.5	43.0	27.0	16.0	9.0	8.0	1.0	9.0	0.05	22.0	17.0	170,000	3.6
April 14	April 29	13.1	56.0	33.0	23.0	5.0	5.0	0.0	16.0	0.10	18.0	20.0	160,000	5.3
April 30	May 7	13.6	47.0	34.0	13.0	10.0	7.0	3.0	10.0	0.10	20.0	23.0	200,000	5.3

TABLE No. 6.

PERIOD COVERED 1907-8		TEMP. DEGREES CENT.	PARTS PER MILLION										BACTERIA PER C. C.	RATE OF FILTRATION MILLION GALLONS PER ACRE PER DAY
			SUSP'D SOLIDS			NITROGEN AS						OXYGEN CONSUMED		
						ORGANIC			FREE AMMONIA	NITRITES	NITRATES			
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.						
SETTLED EFFLUENT FROM NINE-FOOT SPRINKLING FILTER ½″ TO 1½″ STONE.														
Aug. 1	Aug. 2	-----	52.0	21.0	31.0	3.5	3.5	0.0	13.0	-----	-----	11.0	---------	1.5
Aug. 3	Aug. 4	-----	-----	-----	-----	16.0	16.0	0.0	9.5	-----	-----	6.0	---------	1.5
Aug. 5	Aug. 6	-----	8.0	0.4	7.6	7.5	7.5	0.0	-----	-----	-----	16.0	250,000	1.5
Aug. 9	Aug. 10	-----	14.0	2.8	11.2	17.0	16.0	1.0	4.0	1.25	15.0	17.0	420,000	2.0
Aug. 11	Aug. 12	-----	13.2	11.6	1.6	13.0	12.0	1.0	9.5	1.00	15.0	9.0	140,000	1.7
Aug. 13	Aug. 14	-----	8.4	5.6	2.8	4.5	4.5	0.0	6.5	2.00	20.0	11.0	160,000	1.8
Aug. 19	Aug. 20	21.0	3.6	3.2	0.4	8.5	8.5	0.0	5.5	1.65	20.0	13.0	100,000	1.9
Aug. 21	Aug. 22	21.5	8.0	4.0	4.0	7.0	6.0	1.0	4.0	3.00	20.0	10.0	100,000	1.8
Aug. 23	Aug. 24	19.5	7.6	7.6	0.0	12.0	12.0	0.0	4.0	1.10	25.0	10.0	70,000	2.3
Aug. 27	Aug. 28	20.0	8.0	4.8	3.2	7.0	5.0	2.0	5.0	1.20	25.0	11.0	60,000	1.6
Aug. 29	Aug. 30	20.0	9.2	5.2	4.0	12.0	8.5	3.5	4.5	1.30	20.0	13.0	80,000	1.8
Aug. 31	Sept. 1	20.0	7.6	6.0	1.6	7.0	5.0	2.0	7.0	1.35	15.0	13.0	---------	2.6
Sept. 4	Sept. 5	22.5	15.0	13.0	2.0	6.0	5.0	1.0	7.0	1.50	20.0	17.0	---------	2.8
Sept. 6	Sept. 7	20.5	10.4	10.0	0.4	10.0	9.0	1.0	9.0	1.50	15.0	11.0	---------	3.1
Sept. 8	Sept. 9	21.0	21.6	16.8	4.8	9.0	9.0	0.0	13.0	0.80	15.0	17.0	---------	3.1
Sept. 14	Sept. 15	-----	24.4	8.8	15.6	8.0	8.0	0.0	11.0	1.80	15.0	11.0	---------	3.4
Sept. 16	Sept. 17	22.0	16.4	8.8	7.6	9.0	8.0	1.0	12.0	0.70	10.0	15.0	---------	3.5
Filter rested from September 20 to October 21, inclusive.														
Oct. 22	Oct. 23	14.5	74.0	50.0	24.0	14.0	-----	-----	19.0	1.80	3.0	26.0	---------	3.0
Oct. 24	Oct. 25	15.0	-----	-----	-----	13.0	-----	-----	20.0	0.10	1.0	12.0	160,000	-------
Oct. 26	Oct. 27	-----	4.0	3.0	1.0	11.0	-----	-----	23.0	0.30	4.0	10.0	---------	4.3
Filter rested from October 30 to November 6, and November 16 to 20, inclusive.														
Nov. 21	Nov. 22	13.0	52.0	24.0	28.0	11.0	-----	-----	16.0	1.00	15.0	12.0	190,000	2.3
Nov. 23	Nov. 24	-----	38.0	24.0	14.0	5.0	-----	-----	11.0	0.60	15.0	9.0	40,000	4.0
Nov. 25	Nov. 26	12.0	32.0	20.0	12.0	11.0	-----	-----	10.0	0.40	15.0	14.0	60,000	4.0
Filter rested from November 29 to December 2, inclusive.														
Dec. 3	Dec. 4	9.0	54.0	34.0	20.0	8.0	-----	-----	18.0	0.40	25.0	23.0	90,000	2.7
Dec. 5	Dec. 6	8.5	40.0	16.0	24.0	12.0	-----	-----	13.0	0.50	15.0	13.0	130,000	2.6
Dec. 7	Dec. 8	-----	40.0	20.0	20.0	9.0	-----	-----	12.0	0.70	20.0	10.0	---------	2.8
Dec. 20	Dec. 21	9.0	16.0	8.0	8.0	12.0	11.0	1.0	11.0	0.40	18.0	12.0	60,000	-------
Dec. 22	Dec. 23	-----	40.0	18.0	22.0	7.5	1.5	6.0	8.5	0.40	15.0	12.0	---------	-------
Dec. 26	Dec. 27	10.5	20.0	16.0	4.0	9.0	8.0	1.0	12.0	0.60	12.0	15.0	90,000	3.4
Dec. 28	Dec. 29	11.0	24.0	14.0	10.0	12.0	10.0	2.0	11.0	0.20	15.0	14.0	130,000	2.8
Jan. 7	Jan. 9	7.7	32.0	21.0	11.0	12.0	6.0	6.0	9.0	0.40	10.0	11.0	90,000	4.6
Jan. 10	Jan. 12	8.0	43.0	30.0	13.0	7.0	5.0	2.0	10.0	0.50	10.0	11.0	10,000	3.9
Jan. 15	Jan. 17	9.0	27.0	26.0	1.0	6.0	2.0	4.0	11.0	1.10	12.0	16.0	70,000	3.5
Jan. 18	Jan. 20	9.0	48.0	30.0	18.0	7.0	6.0	1.0	13.0	0.05	12.0	21.0	90,000	3.2
Jan. 25	Jan. 27	4.0	42.0	30.0	12.0	7.0	4.0	3.0	11.0	0.30	12.0	11.0	100,000	3.8
Jan. 28	Jan. 30	5.5	40.0	28.0	12.0	7.0	5.0	2.0	9.0	0.60	15.0	15.0	100,000	3.0
Feb. 2	Feb. 4	5.5	46.0	34.0	12.0	6.0	4.0	2.0	10.0	0.10	15.0	16.0	300,000	3.8
Feb. 5	Feb. 7	5.5	22.0	16.0	6.0	8.0	7.0	1.0	11.0	0.20	18.0	21.0	50,000	3.2
Feb. 11	Feb. 13	7.0	40.0	26.0	14.0	12.0	8.5	3.5	7.5	0.30	12.0	16.0	110,000	4.7
Feb. 14	Feb. 16	8.5	22.0	20.0	2.0	10.0	7.0	3.0	11.0	0.05	10.0	18.0	100,000	4.3
Feb. 20	Feb. 22	7.7	19.0	14.0	5.0	7.0	6.0	1.0	8.0	0.10	12.0	16.0	70,000	3.7
Feb. 23	Feb. 25	7.5	30.0	22.0	8.0	7.0	5.0	2.0	11.0	0.10	15.0	19.0	20,000	3.3
Mar. 1	Mar. 3	8.0	24.0	16.5	7.5	8.0	7.0	1.0	8.0	0.05	15.0	18.0	100,000	3.3
Mar. 4	Mar. 6	7.5	22.5	18.5	4.0	5.5	4.5	1.0	6.5	0.05	12.0	15.0	60,000	3.7
Mar. 9	Mar. 11	8.3	33.5	20.5	13.0	10.0	8.0	2.0	7.0	0.20	18.0	17.0	90,000	3.5
Mar. 12	Mar. 14	9.2	27.5	22.0	5.5	7.5	6.5	1.0	7.5	0.20	25.0	16.0	90,000	3.3
Mar. 19	Mar. 24	9.7	28.0	20.0	8.0	7.5	6.5	1.0	8.5	0.30	20.0	14.0	180,000	3.1
Mar. 27	April 11	11.5	20.0	11.0	9.0	9.0	8.0	1.0	9.0	0.10	22.0	15.0	120,000	3.6
April 14	April 29	13.1	42.0	22.0	20.0	11.0	9.0	2.0	11.0	0.20	18.0	19.0	140,000	5.3
April 30	May 7	13.6	30.0	24.0	6.0	10.0	8.0	2.0	10.0	0.10	20.0	21.0	150,000	5.3

TABLE No. 7.

PERIOD COVERED 1907-8		TEMP. DEGREES CENT.	PARTS PER MILLION										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			SUSP'D SOLIDS			NITROGEN AS						Oxygen Consumed		
						ORGANIC			Free Ammonia	Nitrites	Nitrates			
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.						
EFFULENT FROM TWELVE-FOOT SPRINKLING FILTER ½" TO 1½" STONE.														
Aug. 1	Aug. 2	-----	46.0	18.0	28.0	4.0	4.0	0.0	10.0	0.90	5.0	6.0	---------	1.5
Aug. 3	Aug. 4	-----	10.0	10.0	0.0	17.0	15.0	2.0	10.0	1.40	6.0	7.0	---------	1.5
Aug. 5	Aug. 6	-----	1.5	0.5	1.0	8.5	7.5	1.0	5.5	1.80	10.0	18.0	250,000	1.5
Aug. 9	Aug. 10	-----	9.6	3.0	6.6	15.0	15.0	0.0	3.0	1.00	15.0	11.0	310,000	2.0
Aug. 11	Aug. 12	-----	7.6	6.8	0.8	9.0	8.0	1.0	7.0	1.75	15.0	7.0	150,000	1.7
Aug. 13	Aug. 14	-----	10.0	3.2	6.8	5.5	5.5	0.0	3.5	1.75	20.0	8.0	130,000	1.8
Aug. 19	Aug. 20	20.5	3.2	2.8	0.4	15.0	15.0	0.0	3.5	1.50	20.0	11.0	60,000	1.9
Aug. 21	Aug. 22	21.0	9.2	4.4	4.8	2.5	2.5	0.0	4.5	2.25	30.0	10.0	70,000	1.8
Aug. 23	Aug. 24	19.5	8.4	6.8	1.6	10.0	9.0	1.0	3.0	1.20	25.0	9.0	90,000	2.3
Aug. 27	Aug. 28	20.0	7.6	5.6	2.0	7.0	6.0	1.0	3.0	1.00	30.0	10.0	200,000	1.6
Aug. 29	Aug. 30	20.0	4.0	2.8	1.2	13.0	11.0	2.0	2.0	0.80	20.0	9.0	80,000	1.8
Aug. 31	Sept. 1	20.0	10.8	7.6	3.2	8.5	6.5	2.0	3.5	0.90	17.0	12.0	---------	2.6
Sept. 4	Sept. 5	22.5	33.0	20.0	13.0	6.0	6.0	0.0	4.0	1.40	20.0	14.0	---------	2.8
Sept. 6	Sept. 7	20.5	11.2	8.0	3.2	6.5	5.5	1.0	5.5	1.20	20.0	12.0	---------	3.1
Sept. 8	Sept. 9	21.0	22.4	16.8	5.6	9.5	9.5	0.0	8.5	1.10	20.0	12.0	---------	3.1
Sept. 14	Sept. 15	-----	39.8	9.2	29.6	11.0	11.0	0.0	7.0	1.80	20.0	10.0	---------	3.4
Sept. 16	Sept. 17	21.5	11.6	6.8	4.8	12.0	11.0	1.0	7.5	0.80	15.0	13.0	---------	3.5
Filter rested from September 20 to October 21, inclusive.														
Oct. 22	Oct. 23	14.5	106.6	56.0	50.0	13.0	-----	-----	18.0	1.60	0.0	24.0	---------	3.0
Oct. 24	Oct. 25	14.5	15.0	10.0	5.0	9.0	-----	-----	21.0	0.60	1.0	9.0	170,000	-------
Oct. 26	Oct. 27	-----	5.0	4.0	1.0	8.0	-----	-----	21.0	0.80	9.0	8.0	---------	4.3
Filter rested from October 30 to November 6, and November 16 to 20, inclusive.														
Nov. 21	Nov. 22	13.0	106.0	42.0	64.0	14.0	-----	-----	14.0	1.20	15.0	15.0	140,000	2.3
Nov. 23	Nov. 24	-----	76.0	34.0	42.0	7.0	-----	-----	10.0	0.60	15.0	12.0	80,000	4.0
Nov. 25	Nov. 26	12.0	46.0	20.0	26.0	12.0	-----	-----	7.5	0.60	15.0	13.0	80,000	4.0
Filter rested from November 29 to December 2, inclusive.														
Dec. 3	Dec. 4	9.0	102.0	52.0	50.0	14.0	-----	-----	16.0	0.40	15.0	23.0	90,000	2.7
Dec. 5	Dec. 6	8.5	82.0	32.0	50.0	13.0	-----	-----	11.0	0.60	20.0	16.0	120,000	2.6
Dec. 7	Dec. 8	-----	88.0	36.0	52.0	10.0	-----	-----	10.0	0.80	20.0	13.0	---------	2.8
Dec. 20	Dec. 21	9.0	27.0	14.0	13.0	10.0	9.0	1.0	8.0	0.40	22.0	14.0	70,000	-------
Dec. 22	Dec. 23	-----	75.0	37.0	38.0	6.0	4.0	2.0	7.0	0.30	12.0	12.0	---------	-------
Dec. 26	Dec. 27	10.0	33.0	19.0	14.0	10.0	9.0	1.0	9.0	0.60	25.0	11.0	210,000	3.4
Dec. 28	Dec. 29	10.8	34.0	20.0	14.0	8.5	7.5	1.0	8.5	0.40	18.0	11.0	160,000	2.8
Jan. 7	Jan. 9	7.7	45.0	26.0	19.0	8.5	5.5	3.0	8.5	0.60	15.0	15.0	110,000	4.6
Jan. 10	Jan. 12	7.0	58.0	36.0	22.0	6.5	4.5	2.0	7.5	0.30	12.0	12.0	40,000	3.9
Jan. 15	Jan. 17	8.5	61.0	46.0	15.0	8.5	7.5	1.0	6.5	1.20	15.0	16.0	110,000	3.5
Jan. 18	Jan. 20	9.0	68.0	40.0	28.0	11.0	5.0	6.0	8.0	0.10	20.0	19.0	100,000	3.2
Jan. 25	Jan. 27	4.2	43.0	26.0	17.0	7.5	6.5	1.0	8.5	0.10	15.0	14.0	150,000	3.8
Jan. 28	Jan. 30	7.0	60.0	38.0	22.0	7.5	6.5	1.0	5.5	0.60	20.0	15.0	110,000	3.0
Feb. 2	Feb. 4	5.5	40.0	26.0	14.0	5.5	5.5	0.0	7.5	0.20	15.0	20.0	170,000	3.8
Feb. 5	Feb. 7	5.3	34.0	24.0	10.0	8.0	7.0	1.0	7.0	0.20	20.0	19.0	50,000	3.2
Feb. 11	Feb. 13	7.0	38.0	22.0	16.0	8.5	8.5	0.0	6.5	0.20	15.0	14.0	100,000	4.1
Feb. 14	Feb. 16	8.5	36.0	18.0	18.0	9.0	7.0	2.0	6.0	0.00	15.0	11.0	50,000	4.3
Feb. 20	Feb. 22	7.0	44.0	38.0	6.0	9.5	6.5	3.0	5.5	0.10	20.0	16.0	30,000	3.1
Feb. 23	Feb. 25	7.3	34.0	20.0	14.0	7.0	6.0	1.0	8.0	0.05	18.0	17.0	100,000	3.3
Mar. 1	Mar. 3	7.8	29.0	23.0	6.0	9.0	8.0	1.0	5.0	0.10	18.0	14.0	80,000	3.3
Mar. 4	Mar. 6	7.5	31.0	25.0	6.0	6.0	6.0	0.0	5.0	0.10	15.0	13.0	50,000	3.7
Mar. 9	Mar. 11	8.3	54.0	27.0	27.0	9.5	8.5	1.0	5.5	0.40	20.0	18.0	90,000	3.5
Mar. 12	Mar. 14	9.2	55.0	35.0	20.0	10.0	7.0	3.0	5.0	0.30	20.0	15.0	60,000	3.3
Mar. 19	Mar. 24	9.8	97.0	46.0	51.0	10.0	8.0	2.0	7.0	0.60	20.0	19.0	170,000	3.1
Mar. 27	April 11	11.6	33.0	22.0	11.0	9.5	8.5	1.0	6.5	0.05	22.0	15.0	110,000	3.6
April 14	April 29	13.3	51.0	34.0	17.0	11.0	9.5	1.5	8.5	0.10	20.0	21.0	130,000	5.3
April 30	May 7	13.5	49.0	32.0	17.0	9.5	8.5	1.0	6.5	0.10	20.0	22.0	170,000	5.3

TABLE No. 8.

Period Covered 1907-8		Temp. Degrees Cent.	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			Susp'd Solids			Nitrogen as						Oxygen Consumed		
						Organic								
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates			
Settled Effluent From Twelve-foot Sprinkling Filter ½″ to 1½″ Stone.														
Aug. 1	Aug. 2	-----	30.0	16.0	14.0	9.0	5.0	4.0	11.0	-----	-----	9.0	---------	1.5
Aug. 3	Aug. 4	-----	10.0	10.0	0.0	13.0	9.0	4.0	11.0	-----	-----	6.0	---------	1.5
Aug. 5	Aug. 6	-----	2.8	1.6	1.2	6.5	5.5	1.0	-----	-----	-----	14.0	240,000	1.5
Aug. 9	Aug. 10	-----	13.4	3.6	9.8	13.0	11.0	2.0	4.0	1.10	15.0	12.0	210,000	2.0
Aug. 11	Aug. 12	-----	7.2	6.0	1.2	12.0	8.0	4.0	7.5	0.88	15.0	6.0	170,000	1.7
Aug. 13	Aug. 14	-----	6.0	4.8	1.2	6.0	6.0	0.0	4.0	1.75	15.0	8.0	90,000	1.8
Aug. 19	Aug. 20	20.5	4.8	3.2	1.6	15.0	14.0	1.0	4.5	1.50	20.0	10.0	60,000	1.9
Aug. 21	Aug. 22	21.0	8.8	4.0	4.8	8.0	4.0	4.0	4.0	2.50	20.0	14.0	80,000	1.8
Aug. 23	Aug. 24	19.5	4.4	4.4	0.0	12.0	11.0	1.0	4.0	1.20	25.0	10.0	100,000	2.3
Aug. 27	Aug. 28	20.0	6.0	5.2	0.8	8.0	8.0	0.0	3.0	1.20	30.0	9.0	130,000	1.6
Aug. 29	Aug. 30	20.0	2.8	2.0	0.8	11.0	8.5	2.5	2.5	1.00	20.0	10.0	40,000	1.8
Aug. 31	Sept. 1	20.0	7.6	6.4	1.2	7.5	5.5	2.0	3.5	1.15	18.0	13.0	---------	2.6
Sept. 4	Sept. 5	22.5	8.0	6.4	1.6	6.5	5.5	1.0	3.5	1.50	15.0	14.0	---------	2.8
Sept. 6	Sept. 7	20.5	8.0	7.6	0.4	14.0	8.0	6.0	4.0	1.30	20.0	10.0	---------	3.1
Sept. 8	Sept. 9	21.0	20.8	17.6	3.2	13.0	12.0	1.0	10.0	1.10	20.0	15.0	---------	3.1
Sept. 14	Sept. 15	-----	20.0	9.6	10.4	9.0	9.0	0.0	7.0	2.10	20.0	10.0	---------	3.4
Sept. 16	Sept. 17	21.5	14.4	7.6	6.8	11.0	10.0	1.0	9.0	0.70	15.0	12.0	---------	3.5
Filter rested from September 20 to October 21, inclusive.														
Oct. 22	Oct. 23	14.5	74.0	44.0	30.0	13.0	-----	-----	18.0	1.80	10.0	25.0	---------	3.0
Oct. 24	Oct. 25	14.5	-----	-----	-----	9.0	-----	-----	21.0	0.40	1.0	11.0	160,000	-------
Oct. 26	Oct. 27	-----	6.0	3.0	3.0	10.0	-----	-----	21.0	0.80	8.0	10.0	---------	4.3
Filter rested from October 30 to November 6, and November 16 to 20, inclusive.														
Nov. 21	Nov. 22	13.0	38.0	14.0	24.0	14.0	-----	-----	14.0	1.20	15.0	12.0	170,000	2.3
Nov. 23	Nov. 24	-----	56.0	30.0	26.0	6.0	-----	-----	10.0	0.60	20.0	9.0	80,000	4.0
Nov. 25	Nov. 26	12.0	40.0	22.0	18.0	9.5	-----	-----	7.5	1.00	20.0	12.0	60,000	4.0
Filter rested from November 29 to December 2, inclusive.														
Dec. 3	Dec. 4	9.0	54.0	34.0	20.0	10.0	-----	-----	16.0	0.50	25.0	19.0	90,000	2.7
Dec. 5	Dec. 6	8.5	46.0	18.0	28.0	11.0	-----	-----	11.0	0.60	20.0	13.0	100,000	2.6
Dec. 7	Dec. 8	-----	44.0	16.0	28.0	10.0	-----	-----	9.0	0.70	30.0	11.0	---------	2.8
Dec. 20	Dec. 21	9.0	18.0	9.0	9.0	14.0	12.0	2.0	8.0	0.40	22.0	13.0	50,000	-------
Dec. 22	Dec. 23	-----	38.0	15.0	23.0	9.0	7.0	2.0	7.0	0.80	15.0	11.0	---------	-------
Dec. 26	Dec. 27	10.0	19.0	12.0	7.0	10.0	9.0	1.0	9.0	0.60	20.0	16.0	800	3.4
Dec. 28	Dec. 29	10.8	20.0	15.0	5.0	8.0	6.0	2.0	8.0	0.20	20.0	13.0	250	2.8
Jan. 7	Jan. 9	7.7	30.0	21.0	9.0	9.0	6.0	3.0	8.0	0.60	12.0	13.0	3,000	4.6
Jan. 10	Jan. 12	7.0	40.0	24.0	16.0	7.0	6.0	1.0	7.0	0.40	12.0	11.0	600	3.9
Jan. 15	Jan. 17	8.5	36.0	31.0	5.0	8.5	6.5	2.0	6.5	1.40	15.0	17.0	2,000	3.5
Jan. 18	Jan. 20	9.0	50.0	26.0	24.0	12.0	6.5	5.5	7.5	0.05	18.0	20.0	2,000	3.2
Jan. 25	Jan. 27	4.2	42.0	30.0	12.0	7.5	5.5	2.0	8.5	0.10	15.0	11.0	2,000	3.8
Jan. 28	Jan. 30	7.0	32.0	24.0	8.0	7.5	6.5	1.0	5.5	0.40	20.0	14.0	2,000	3.0
Feb. 2	Feb. 4	5.5	30.0	21.0	9.0	4.5	3.5	1.0	8.5	0.20	15.0	22.0	6,000	3.8
Feb. 5	Feb. 7	5.3	17.0	12.0	5.0	6.5	5.5	1.0	7.5	0.10	20.0	22.0	1,100	3.2
Feb. 11	Feb. 13	7.0	34.0	22.0	12.0	9.5	8.5	1.0	5.5	0.20	15.0	15.0	8,000	4.1
Feb. 14	Feb. 16	8.5	22.0	14.0	8.0	7.5	6.5	1.0	5.5	0.00	15.0	11.0	10,000	4.3
Feb. 20	Feb. 22	7.0	20.0	14.0	6.0	6.0	5.0	1.0	6.0	0.10	20.0	16.0	3,000	3.1
Feb. 23	Feb. 25	7.3	28.0	18.0	10.0	7.0	6.0	1.0	8.0	0.10	18.0	17.0	200	3.3
Mar. 1	Mar. 3	7.8	19.0	14.0	5.0	9.0	8.0	1.0	5.0	0.05	20.0	13.0	880	3.3
Mar. 4	Mar. 6	7.5	23.5	16.5	7.0	6.0	6.0	0.0	5.0	0.10	15.0	13.0	500	3.7
Mar. 9	Mar. 11	8.3	28.0	16.0	12.0	9.5	8.5	1.0	5.5	0.20	20.0	15.0	1,800	3.5
Mar. 12	Mar. 14	9.2	31.0	22.5	8.5	7.0	7.0	0.0	5.0	0.40	25.0	17.0	800	3.3
Mar. 19	Mar. 24	9.8	29.0	18.0	11.0	8.0	6.0	2.0	7.0	0.20	20.0	17.0	1,200	3.1
Mar. 27	April 11	11.6	29.0	19.0	10.0	9.2	8.2	1.0	6.8	0.05	22.0	14.0	1,200	3.6
April 14	April 29	13.3	38.0	20.0	18.0	10.0	7.0	3.0	9.0	0.10	22.0	22.0	1,500	5.3
April 30	May 7	13.5	30.0	21.0	9.0	13.0	9.5	3.5	6.5	0.10	20.0	20.0	1,600	5.3

TABLE No. 9.

Period Covered 1907-8		Temp. Degrees Cent.	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			Susp'd Solids			Nitrogen as						Oxygen Consumed		
						Organic			Free Ammonia	Nitrites	Nitrates			
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.						
Effluent From Six-foot Sprinkling Filter 1″ to 2″ Stone.														
Aug. 1	Aug. 2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	---------	1.5
Aug. 3	Aug. 4	-----	15.0	9.0	6.0	5.0	4.0	1.0	13.0	0.50	3.0	9.0	---------	1.5
Aug. 5	Aug. 6	-----	16.0	9.5	6.5	10.0	6.0	4.0	14.0	2.00	5.0	23.0	560,000	1.5
Aug. 9	Aug. 10	-----	12.0	5.4	6.6	28.0	12.0	16.0	8.0	1.75	10.0	16.0	270,000	2.0
Aug. 11	Aug. 12	-----	46.0	21.0	25.0	11.0	11.0	0.0	9.0	3.50	18.0	23.0	360,000	1.7
Aug. 13	Aug. 14	-----	109.0	38.0	71.0	15.0	14.0	1.0	9.5	3.75	10.0	20.0	350,000	1.8
Aug. 19	Aug. 20	20.5	13.2	8.4	4.8	12.0	12.0	0.0	12.0	3.25	10.0	12.0	90,000	1.9
Aug. 21	Aug. 22	20.5	36.0	17.0	19.0	4.0	4.0	0.0	14.0	3.75	15.0	19.0	180,000	1.8
Aug. 23	Aug. 24	20.0	47.5	24.5	23.0	8.0	6.0	2.0	14.0	1.70	15.0	16.0	390,000	2.3
Aug. 27	Aug. 28	20.0	27.0	16.0	11.0	6.0	4.0	2.0	14.0	1.60	15.0	17.0	560,000	1.6
Aug. 29	Aug. 30	20.0	30.0	15.0	15.0	12.0	8.0	4.0	14.0	0.70	10.0	11.0	160,000	1.8
Aug. 31	Sept. 1	20.0	19.5	14.5	5.5	8.0	8.0	0.0	16.0	1.40	12.0	19.0	---------	2.6
Sept. 4	Sept. 5	22.0	48.0	33.0	15.0	7.0	6.0	1.0	16.0	1.20	10.0	24.0	---------	2.8
Sept. 6	Sept. 7	20.5	13.0	8.0	5.0	9.0	7.0	2.0	15.0	1.30	10.0	16.0	---------	3.1
Sept. 8	Sept. 9	21.0	41.0	22.5	18.5	9.0	8.0	1.0	16.0	0.70	10.0	25.0	---------	3.1
Sept. 14	Sept. 15	-----	23.6	15.2	8.4	12.0	11.0	1.0	17.0	1.20	9.0	18.0	---------	3.4
Sept. 16	Sept. 17	22.5	39.0	22.0	17.0	13.0	13.0	0.0	17.0	0.80	8.0	22.0	---------	3.5
Filter rested from September 20 to October 21, inclusive.														
Oct. 22	Oct. 23	15.5	76.0	48.0	28.0	15.0	-----	-----	19.0	0.40	0.0	33.0	---------	3.0
Oct. 24	Oct. 25	15.0	26.0	26.0	0.0	16.0	-----	-----	20.0	0.10	0.0	15.0	120,000	-------
Oct. 26	Oct. 27	-----	19.0	18.0	1.0	11.0	-----	-----	22.0	0.40	2.0	25.0	---------	4.3
Filter rested from October 30 to November 6, and November 16 to 20, inclusive.														
Nov. 21	Nov. 22	14.0	110.0	60.0	50.0	18.0	-----	-----	20.0	1.80	5.0	20.0	180,000	2.3
Nov. 23	Nov. 24	-----	64.0	38.0	26.0	9.0	-----	-----	14.0	1.00	10.0	14.0	180,000	4.0
Nov. 25	Nov. 26	12.5	54.0	24.0	30.0	13.0	-----	-----	12.0	0.60	9.0	17.0	240,000	4.0
Filter rested from November 29 to December 2, inclusive.														
Dec. 3	Dec. 4	8.0	130.0	72.0	58.0	15.0	-----	-----	24.0	0.40	8.0	42.0	180,000	2.7
Dec. 5	Dec. 6	9.0	76.0	32.0	44.0	14.0	-----	-----	18.0	0.50	8.0	23.0	260,000	2.6
Dec. 7	Dec. 8	-----	72.0	40.0	32.0	12.0	-----	-----	18.0	1.60	10.0	19.0	---------	2.8
Dec. 20	Dec. 21	11.0	75.0	33.0	42.0	12.0	11.0	1.0	16.0	0.50	12.0	22.0	150,000	-------
Dec. 22	Dec. 23	-----	71.0	39.0	32.0	13.0	9.0	4.0	13.0	0.60	12.0	21.0	---------	-------
Dec. 26	Dec. 27	10.0	44.0	31.0	13.0	12.0	9.0	3.0	16.0	0.70	6.0	25.0	220,000	3.4
Dec. 28	Dec. 29	11.0	57.0	44.0	13.0	13.0	10.0	3.0	14.0	0.80	8.0	22.0	290,000	3.8
Jan. 7	Jan. 9	8.3	68.0	49.0	19.0	11.0	9.0	2.0	11.0	0.60	7.0	20.0	140,000	4.6
Jan. 10	Jan. 12	8.0	59.0	48.0	11.0	6.0	5.0	1.0	13.0	0.60	5.0	18.0	60,000	3.9
Jan. 15	Jan. 17	8.5	49.0	47.0	2.0	10.0	9.0	1.0	13.0	1.40	8.0	27.0	180,000	3.5
Jan. 18	Jan. 20	9.0	71.0	58.0	13.0	9.0	7.0	2.0	17.0	0.40	8.0	31.0	230,000	3.2
Jan. 25	Jan. 27	4.0	71.0	64.0	7.0	12.0	10.0	2.0	14.0	0.40	6.0	24.0	140,000	3.8
Jan. 28	Jan. 30	7.0	60.0	48.0	12.0	10.0	9.0	1.0	13.0	0.30	7.0	26.0	190,000	3.0
Feb. 2	Feb. 4	6.0	48.0	38.0	10.0	9.0	8.0	1.0	16.0	0.20	7.0	35.0	480,000	3.8
Feb. 5	Feb. 7	6.2	136.0	100.0	36.0	16.0	13.0	3.0	16.0	0.20	10.0	42.0	300,000	3.2
Feb. 11	Feb. 13	7.0	64.0	52.0	12.0	10.0	8.0	2.0	13.0	0.40	7.0	26.0	170,000	4.1
Feb. 14	Feb. 16	8.5	48.0	40.0	8.0	9.0	8.0	1.0	13.0	0.10	7.0	18.0	210,000	4.3
Feb. 20	Feb. 22	6.8	91.0	70.0	21.0	10.0	8.0	2.0	13.0	0.40	10.0	29.0	150,000	3.1
Feb. 23	Feb. 25	7.5	68.0	54.0	14.0	11.0	9.0	2.0	15.0	0.10	7.0	31.0	180,000	3.8
Mar. 1	Mar. 3	8.0	93.0	76.0	17.0	13.0	9.0	4.0	14.0	0.20	10.0	32.0	130,000	3.3
Mar. 4	Mar. 6	7.5	91.0	77.0	14.0	9.0	8.0	1.0	12.0	0.30	7.0	28.0	170,000	3.7
Mar. 9	Mar. 11	8.0	189.0	153.0	36.0	11.0	9.0	2.0	13.0	0.30	8.0	51.0	250,000	3.5
Mar. 12	Mar. 14	8.5	154.0	126.0	28.0	13.0	9.0	4.0	13.0	0.30	12.0	46.0	110,000	3.3
Mar. 19	Mar. 24	9.2	94.0	82.0	12.0	22.0	14.0	8.0	16.0	0.30	10.0	38.0	240,000	3.1
Mar. 27	April 11	11.3	106.0	84.0	22.0	14.0	11.0	3.0	16.0	0.10	7.0	37.0	430,000	3.6
April 14	April 29	13.0	56.0	41.0	15.0	12.0	10.0	2.0	15.0	0.10	7.0	32.0	230,000	5.3
April 30	May 7	13.9	55.0	38.0	17.0	12.0	10.0	2.0	16.0	0.40	12.0	33.0	190,000	5.3

TABLE No. 10.

PERIOD COVERED 1907-8		TEMP. DEGREES CENT.	PARTS PER MILLION										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			SUSP'D SOLIDS			NITROGEN AS						Oxygen Consumed		
						ORGANIC			Free Ammonia	Nitrites	Nitrates			
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.						
SETTLED EFFLUENT FROM SIX-FOOT BED 1″ TO 2″ STONE.														
Aug. 1	Aug. 2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----------	1.5
Aug. 3	Aug. 4	-----	16.0	12.0	4.0	5.0	2.0	3.0	12.0	-----	-----	5.0	----------	1.5
Aug. 5	Aug. 6	-----	14.8	9.6	5.2	8.0	6.0	2.0	-----	-----	-----	18.0	510,000	1.5
Aug. 9	Aug. 10	-----	9.2	3.8	5.4	10.0	8.0	2.0	9.0	2.00	10.0	14.0	290,000	2.0
Aug. 11	Aug. 12	-----	19.0	13.4	5.6	13.0	12.0	1.0	9.5	2.50	13.0	12.0	280,000	1.7
Aug. 13	Aug. 14	-----	8.4	4.8	3.6	5.0	3.0	2.0	10.0	4.25	10.0	15.0	310,000	1.8
Aug. 19	Aug. 20	20.5	6.8	5.2	1.6	16.0	16.0	0.0	7.0	3.50	10.0	12.0	130,000	1.9
Aug. 21	Aug. 22	20.5	8.4	4.0	4.4	3.0	2.0	1.0	15.0	5.00	15.0	14.0	100,000	1.8
Aug. 23	Aug. 24	20.0	16.8	7.6	9.2	6.0	6.0	0.0	13.0	2.00	20.0	15.0	170,000	2.3
Aug. 27	Aug. 28	20.0	6.0	6.0	0.0	7.0	6.0	1.0	14.0	1.80	15.0	13.0	260,000	1.6
Aug. 29	Aug. 30	20.0	9.2	6.0	3.2	11.0	8.0	3.0	14.0	0.60	8.0	11.0	140,000	1.8
Aug. 31	Sept. 1	20.0	10.8	7.6	3.2	8.0	7.0	1.0	16.0	1.75	12.0	20.0	----------	2.6
Sept. 4	Sept. 5	22.0	20.0	15.0	5.0	9.0	9.0	0.0	16.0	1.10	5.0	18.0	----------	2.8
Sept. 6	Sept. 7	20.5	10.0	5.6	4.4	8.0	4.0	4.0	16.0	1.60	5.0	13.0	----------	3.1
Sept. 8	Sept. 9	21.0	27.2	16.0	11.2	9.0	8.0	1.0	16.0	0.60	5.0	21.0	----------	3.1
Sept. 14	Sept. 15	-----	15.6	11.6	4.0	8.0	8.0	0.0	17.0	1.30	9.0	12.0	----------	3.4
Sept. 16	Sept. 17	22.5	24.8	24.8	0.0	13.0	13.0	0.0	17.0	0.80	6.0	18.0	----------	3.5
Filter rested from September 20 to October 21, inclusive.														
Oct. 22	Oct. 23	15.5	60.0	40.0	20.0	13.0	-----	-----	21.0	1.30	1.0	29.0	----------	3.0
Oct. 24	Oct. 25	15.0	15.0	14.0	1.0	15.0	-----	-----	20.0	0.30	0.0	15.0	210,000	-------
Oct. 26	Oct. 27	-----	12.0	10.0	2.0	10.0	-----	-----	23.0	0.20	1.0	13.0	----------	4.3
Filter rested from October 30 to November 6, and November 16 to 20, inclusive.														
Nov. 21	Nov. 22	14.0	60.0	42.0	18.0	17.0	-----	-----	20.0	1.60	5.0	14.0	280,000	2.3
Nov. 23	Nov. 24	-----	56.0	32.0	24.0	8.0	-----	-----	14.0	1.00	10.0	19.0	150,000	4.0
Nov. 25	Nov. 26	12.5	50.0	24.0	26.0	13.0	-----	-----	13.0	0.60	5.0	12.0	140,000	4.0
Filter rested from November 29 to December 2, inclusive.														
Dec. 3	Dec. 4	8.0	72.0	44.0	28.0	15.0	-----	-----	24.0	0.40	5.0	30.0	190,000	2.7
Dec. 5	Dec. 6	9.0	40.0	16.0	24.0	13.0	-----	-----	17.0	0.30	10.0	21.0	190,000	2.6
Dec. 7	Dec. 8	-----	48.0	28.0	20.0	12.0	-----	-----	18.0	1.00	15.0	13.0	----------	2.8
Dec. 20	Dec. 21	11.0	55.0	18.0	37.0	11.0	10.0	1.0	16.0	0.50	15.0	17.0	120,000	-------
Dec. 22	Dec. 23	-----	33.0	17.0	16.0	9.0	7.0	2.0	13.0	0.50	15.0	14.0	----------	-------
Dec. 26	Dec. 27	10.0	29.0	23.0	6.0	8.0	6.0	2.0	17.0	0.60	8.0	16.0	220,000	3.4
Dec. 28	Dec. 29	11.0	33.0	24.0	9.0	14.0	11.0	3.0	14.0	0.40	12.0	17.0	220,000	2.8
Jan. 7	Jan. 9	8.3	36.0	26.0	10.0	10.0	7.0	3.0	12.0	0.40	7.0	18.0	130,000	4.6
Jan. 10	Jan. 12	8.0	36.0	24.0	12.0	8.0	4.0	4.0	13.0	0.40	7.0	15.0	80,000	3.9
Jan. 15	Jan. 17	8.5	32.0	28.0	4.0	8.0	7.0	1.0	13.0	1.20	9.0	18.0	100,000	3.5
Jan. 18	Jan. 20	9.0	36.0	28.0	8.0	8.0	6.0	2.0	18.0	0.40	8.0	26.0	170,000	3.2
Jan. 25	Jan. 27	4.0	50.0	43.0	7.0	9.0	6.0	3.0	15.0	0.40	6.0	16.0	220,000	3.8
Jan. 28	Jan. 30	7.0	41.0	30.0	11.0	10.0	8.0	2.0	13.0	0.50	7.0	22.0	190,000	3.0
Feb. 2	Feb. 4	6.0	40.0	32.0	8.0	6.0	5.0	1.0	18.0	0.20	7.0	34.0	330,000	3.8
Feb. 5	Feb. 7	6.2	24.0	16.0	8.0	12.0	10.0	2.0	15.0	0.20	10.0	29.0	160,000	3.2
Feb. 11	Feb. 13	7.0	28.0	20.0	8.0	11.0	10.0	1.0	12.0	0.40	7.0	21.0	140,000	4.1
Feb. 14	Feb. 16	8.5	25.0	22.0	3.0	9.0	8.0	1.0	13.0	0.10	7.0	18.0	100,000	4.3
Feb. 20	Feb. 22	6.8	34.0	26.0	8.0	9.0	8.0	1.0	13.0	0.40	10.0	22.0	50,000	3.1
Feb. 23	Feb. 25	7.5	30.0	28.0	2.0	8.0	7.0	1.0	16.0	0.15	8.0	24.0	190,000	3.3
Mar. 1	Mar. 3	8.0	33.0	33.0	0.0	10.0	8.0	2.0	14.0	0.20	10.0	24.0	110,000	3.3
Mar. 4	Mar. 6	7.5	34.0	34.0	0.0	7.0	5.0	2.0	13.0	0.30	8.0	20.0	120,000	3.7
Mar. 9	Mar. 11	8.0	36.0	25.0	11.0	10.0	9.0	1.0	13.0	0.30	8.0	22.0	150,000	3.5
Mar. 12	Mar. 14	8.5	17.0	17.0	0.0	8.0	7.0	1.0	13.0	0.40	12.0	20.0	80,000	3.3
Mar. 19	Mar. 24	9.2	13.0	12.0	1.0	11.0	8.0	3.0	16.0	0.30	12.0	15.0	500,000	3.1
Mar. 27	April 11	11.3	19.0	13.0	6.0	11.0	10.0	1.0	16.0	0.05	8.0	19.0	190,000	8.6
April 14	April 29	13.0	57.0	42.0	15.0	12.0	10.0	2.0	15.0	0.20	7.0	27.0	160,000	5.3
April 30	May 7	13.9	44.0	33.0	11.0	10.0	9.0	1.0	16.0	0.40	10.0	26.0	170,000	5.3

TABLE No 11.

Period Covered 1907-8		Temp. Degrees Cent.	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			Susp'd Solids			Nitrogen as						Oxygen Consumed		
						Organic								
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates			
Effluent From Nine-foot Sprinkling Filter 1" to 2" Stone.														
Aug. 1	Aug. 2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	---------	1.5
Aug. 3	Aug. 4	-----	12.0	12.0	0.0	6.0	5.0	1.0	10.0	2.00	4.0	10.0	---------	1.5
Aug. 5	Aug. 6	-----	9.5	5.0	4.5	7.0	6.0	1.0	11.0	1.60	6.5	17.0	580,000	1.5
Aug. 9	Aug. 10	-----	13.0	5.6	7.4	9.0	9.0	0.0	7.0	1.75	10.0	14.0	330,000	2.0
Aug. 11	Aug. 12	-----	18.6	10.4	8.2	16.0	13.0	3.0	5.5	2.13	15.0	11.0	250,000	1.7
Aug. 13	Aug. 14	-----	12.4	5.2	7.2	8.5	7.5	1.0	6.5	3.25	15.0	11.0	190,000	1.8
Aug. 19	Aug. 20	20.5	9.6	8.8	0.8	14.0	14.0	0.0	6.0	3.25	15.0	13.0	110,000	1.9
Aug. 21	Aug. 22	19.5	24.8	10.8	14.0	5.0	5.0	0.0	9.0	4.50	20.0	13.0	200,000	1.8
Aug. 23	Aug. 24	20.0	14.5	7.0	7.5	10.0	10.0	0.0	9.0	1.50	15.0	13.0	270,000	2.3
Aug. 27	Aug. 28	20.0	14.0	11.0	3.0	5.0	4.0	1.0	8.0	1.90	20.0	12.0	350,000	1.6
Aug. 29	Aug. 30	20.0	9.6	9.2	0.4	13.0	11.0	2.0	7.0	0.60	15.0	10.0	190,000	1.8
Aug. 31	Sept. 1	20.0	12.0	10.4	1.6	11.0	11.0	0.0	8.5	1.75	15.0	14.0	---------	2.6
Sept. 4	Sept. 5	22.0	38.0	24.0	14.0	5.0	3.0	2.0	11.0	1.60	15.0	18.0	---------	2.8
Sept. 6	Sept. 7	20.0	11.6	9.2	2.4	6.5	6.5	0.0	9.5	1.80	15.0	13.0	---------	3.1
Sept. 8	Sept. 9	21.0	21.6	17.6	4.0	11.0	11.0	0.0	13.0	1.10	10.0	15.0	---------	3.1
Sept. 14	Sept. 15	-----	20.0	8.8	11.2	11.0	11.0	0.0	12.0	2.20	15.0	10.0	---------	3.4
Sept. 16	Sept. 17	22.5	17.6	10.4	7.2	8.0	8.0	0.0	12.0	0.90	10.0	16.0	---------	3.5
Filter rested from September 20 to October 21, inclusive.														
Oct. 22	Oct. 23	15.0	48.0	34.0	14.0	13.0	-----	-----	19.0	1.60	2.0	22.0	---------	3.0
Oct. 24	Oct. 25	15.0	14.0	12.0	2.0	14.0	-----	-----	19.0	0.60	3.0	11.0	150,000	-------
Oct. 26	Oct. 27	-----	11.0	9.0	2.0	10.0	-----	-----	20.0	0.60	6.0	12.0	---------	4.3
Filter rested from October 30 to November 6, and November 16 to 20, inclusive.														
Nov. 21	Nov. 22	14.0	62.0	40.0	22.0	14.0	-----	-----	14.0	1.30	15.0	13.0	180,000	2.3
Nov. 23	Nov. 24	-----	66.0	34.0	32.0	10.0	-----	-----	10.0	0.80	15.0	12.0	70,000	4.0
Nov. 25	Nov. 26	12.0	52.0	20.0	32.0	11.0	-----	-----	9.0	0.60	10.0	12.0	120,000	4.0
Filter rested from November 29 to December 2, inclusive.														
Dec. 3	Dec. 4	8.0	112.0	62.0	50.0	13.0	-----	-----	20.0	0.50	15.0	30.0	130,000	2.7
Dec. 5	Dec. 6	8.5	84.0	38.0	46.0	13.0	-----	-----	14.0	0.40	10.0	21.0	140,000	2.6
Dec. 7	Dec. 8	-----	84.0	42.0	42.0	12.0	-----	-----	12.0	1.10	20.0	14.0	---------	2.8
Dec. 20	Dec. 21	9.0	121.0	26.0	95.0	13.0	12.0	1.0	11.0	0.50	15.0	16.0	260,000	-------
Dec. 22	Dec. 23	-----	159.0	72.0	87.0	10.0	3.0	7.0	10.0	0.40	15.0	18.0	---------	-------
Dec. 26	Dec. 27	9.5	56.0	34.0	22.0	9.0	7.0	2.0	13.0	0.70	12.0	15.0	140,000	3.4
Dec. 28	Dec. 29	11.0	51.0	33.0	18.0	13.0	11.0	2.0	11.0	0.60	15.0	16.0	---------	2.8
Jan. 7	Jan. 9	8.3	34.0	24.0	10.0	11.0	7.0	4.0	10.0	0.70	8.0	15.0	120,000	4.6
Jan. 10	Jan. 12	7.0	53.0	38.0	15.0	7.0	5.0	2.0	10.0	0.50	10.0	13.0	80,000	3.9
Jan. 15	Jan. 17	8.5	36.0	34.0	2.0	9.0	8.0	1.0	9.0	1.30	12.0	17.0	180,000	3.5
Jan. 18	Jan. 20	9.0	36.0	26.0	10.0	14.0	8.0	6.0	12.0	0.30	12.0	33.0	160,000	3.2
Jan. 25	Jan. 27	4.3	58.0	48.0	10.0	10.0	7.0	3.0	12.0	3.20	8.0	15.0	230,000	3.8
Jan. 28	Jan. 30	7.2	64.0	48.0	16.0	9.0	7.0	2.0	12.0	0.40	12.0	19.0	130,000	3.0
Feb. 2	Feb. 4	5.5	44.0	33.0	11.0	8.0	7.0	1.0	12.0	0.40	12.0	27.0	140,000	8.8
Feb. 5	Feb. 7	5.3	107.0	71.0	36.0	12.0	9.0	3.0	13.0	0.20	15.0	27.0	80,000	8.2
Feb. 11	Feb. 13	7.2	41.0	28.0	13.0	10.0	7.0	3.0	12.0	0.40	10.0	20.0	110,000	4.1
Feb. 14	Feb. 16	8.2	38.0	26.0	12.0	6.0	5.0	1.0	11.0	0.05	12.0	15.0	120,000	4.3
Feb. 20	Feb. 22	6.8	44.0	32.0	12.0	8.0	7.0	1.0	11.0	0.20	10.0	18.0	80,000	3.1
Feb. 23	Feb. 25	7.3	48.0	40.0	8.0	9.0	7.0	2.0	13.0	0.20	15.0	18.0	100,000	3.3
Mar. 1	Mar. 3	7.8	43.0	39.0	4.0	11.0	9.0	2.0	10.0	0.20	12.0	19.0	110,000	3.3
Mar. 4	Mar. 6	7.3	184.0	136.0	48.0	12.0	5.0	7.0	12.0	0.30	12.0	34.0	130,000	3.7
Mar. 9	Mar. 11	8.2	53.0	40.0	13.0	10.0	7.0	3.0	9.0	0.20	15.0	19.0	160,000	3.5
Mar. 12	Mar. 14	8.8	46.0	37.0	9.0	9.0	8.0	1.0	9.0	0.30	25.0	17.0	130,000	3.3
Mar. 19	Mar. 24	9.4	43.0	34.0	9.0	10.0	8.0	2.0	11.0	0.80	20.0	14.0	180,000	3.1
Mar. 27	April 11	11.4	40.0	28.0	12.0	10.0	9.0	1.0	12.0	0.10	25.0	16.0	170,000	3.6
April 14	April 29	13.0	73.0	45.0	28.0	11.0	10.0	1.0	13.0	0.30	24.0	24.0	120,000	5.3
April 30	May 7	13.9	50.0	36.0	14.0	11.0	10.0	1.0	12.0	0.20	25.0	28.0	150,000	5.3

TABLE No. 12.

Period Covered 1907-8		Temp. Degrees Cent.	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			Susp'd Solids			Nitrogen as						Oxygen Consumed		
						Organic								
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates			
Settled Effluent From Nine-foot Bed 1″ to 2″ Stone.														
Aug. 1	Aug. 2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	---------	1.5
Aug. 3	Aug. 4	-----	14.0	10.0	4.0	4.0	1.0	3.0	12.0	-----	-----	8.0	---------	1.5
Aug. 5	Aug. 6	-----	6.0	2.4	3.6	7.0	7.0	0.0	-----	-----	-----	18.0	440,000	1.5
Aug. 9	Aug. 10	-----	11.4	4.6	6.8	8.5	8.5	0.0	7.5	2.00	10.0	15.0	400,000	2.0
Aug. 11	Aug. 12	-----	14.4	8.4	6.0	9.0	-----	-----	6.0	2.38	13.0	9.0	200,000	1.7
Aug. 13	Aug. 14	-----	6.4	4.4	2.0	2.5	1.5	1.0	7.5	3.50	10.0	9.0	120,000	1.8
Aug. 19	Aug. 20	20.5	8.4	6.8	1.6	15.0	15.0	0.0	5.0	3.35	20.0	12.0	70,000	1.9
Aug. 21	Aug. 22	19.5	12.4	7.2	5.6	3.0	1.0	2.0	11.0	5.00	20.0	13.0	90,000	1.8
Aug. 23	Aug. 24	20.0	10.4	6.4	4.0	8.0	8.0	0.0	10.0	1.70	15.0	11.0	110,000	2.3
Aug. 27	Aug. 28	20.0	8.8	6.4	2.4	5.5	3.5	2.0	9.5	2.00	20.0	10.0	370,000	1.6
Aug. 29	Aug. 30	20.0	8.4	4.8	3.6	12.0	11.0	1.0	8.0	0.70	15.0	12.0	280,000	1.8
Aug. 31	Sept. 1	20.0	8.0	6.4	1.6	11.0	11.0	0.0	8.5	1.90	16.0	15.0	---------	2.6
Sept. 4	Sept. 5	22.0	21.0	19.0	2.0	3.0	3.0	0.0	11.0	1.30	15.0	15.0	---------	2.8
Sept. 6	Sept. 7	20.5	8.0	5.6	2.4	7.0	6.0	1.0	10.0	1.80	15.0	11.0	---------	3.1
Sept. 8	Sept. 9	21.0	19.2	10.8	8.4	9.0	9.0	0.0	14.0	0.80	7.0	14.0	---------	3.1
Sept. 14	Sept. 15	-----	10.4	6.8	3.6	11.0	11.0	0.0	11.0	2.10	15.0	13.0	---------	3.4
Sept. 16	Sept. 17	22.5	13.6	8.0	5.6	10.0	8.0	2.0	12.0	1.20	10.0	15.0	---------	3.5
Filter rested from September 20 to October 21, inclusive.														
Oct. 22	Oct. 23	15.0	48.0	28.0	20.0	13.0	-----	-----	19.0	1.60	10.0	24.0	---------	3.0
Oct. 24	Oct. 25	15.0	14.0	14.0	0.0	18.0	-----	-----	15.0	0.60	1.0	11.0	130,000	-------
Oct. 26	Oct. 27	-----	13.0	8.0	5.0	28.0	-----	-----	20.0	0.60	5.0	11.0	---------	4.3
Filter rested from October 30 to November 6, and November 16 to 20, inclusive.														
Nov. 21	Nov. 22	14.0	44.0	26.0	18.0	12.0	-----	-----	14.0	1.20	15.0	11.0	190,000	2.3
Nov. 23	Nov. 24	-----	48.0	28.0	20.0	9.0	-----	-----	10.0	0.60	15.0	10.0	40,000	4.0
Nov. 25	Nov. 26	12.0	34.0	12.0	22.0	9.0	-----	-----	8.0	1.40	15.0	11.0	60,000	4.0
Filter rested from November 29 to December 2, inclusive.														
Dec. 3	Dec. 4	8.0	56.0	30.0	26.0	11.0	-----	-----	20.0	0.60	15.0	25.0	120,000	2.7
Dec. 5	Dec. 6	8.5	40.0	14.0	26.0	11.0	-----	-----	14.0	0.60	15.0	14.0	130,000	2.6
Dec. 7	Dec. 8	-----	48.0	22.0	26.0	10.0	-----	-----	12.0	0.60	20.0	11.0	---------	2.8
Dec. 20	Dec. 21	9.0	22.0	13.0	9.0	12.0	11.0	1.0	11.0	0.50	12.0	13.0	210,000	-------
Dec. 22	Dec. 23	-----	82.0	26.0	56.0	9.0	3.0	6.0	10.0	0.60	12.0	16.0	---------	-------
Dec. 26	Dec. 27	9.5	32.0	19.0	13.0	11.0	10.0	1.0	12.0	0.60	12.0	15.0	110,000	3.4
Dec. 28	Dec. 29	11.0	35.0	25.0	10.0	12.0	10.0	2.0	11.0	0.40	12.0	17.0	120,000	2.8
Jan. 7	Jan. 9	8.3	62.0	34.0	28.0	10.0	9.0	1.0	10.0	0.40	8.0	13.0	100,000	4.6
Jan. 10	Jan. 12	7.0	42.0	23.0	19.0	7.5	6.5	1.0	9.5	0.50	10.0	13.0	90,000	3.9
Jan. 15	Jan. 17	8.5	27.0	26.0	1.0	9.0	7.0	2.0	9.0	1.40	12.0	17.0	60,000	3.5
Jan. 18	Jan. 20	9.0	36.0	26.0	10.0	8.0	7.0	1.0	13.0	0.40	12.0	22.0	150,000	3.2
Jan. 25	Jan. 27	4.3	37.0	28.0	9.0	9.0	9.0	0.0	13.0	0.20	10.0	13.0	220,000	3.8
Jan. 28	Jan. 30	7.2	36.0	28.0	8.0	10.0	8.0	2.0	11.0	0.30	12.0	18.0	180,000	3.0
Feb. 2	Feb. 4	5.5	39.0	31.0	8.0	10.0	8.0	2.0	13.0	0.20	12.0	27.0	230,000	3.8
Feb. 5	Feb. 7	5.3	22.0	13.0	9.0	9.0	8.0	1.0	13.0	0.20	15.0	23.0	140,000	3.2
Feb. 11	Feb. 13	7.2	31.0	24.0	7.0	9.0	7.0	2.0	12.0	0.40	10.0	18.0	130,000	4.1
Feb. 14	Feb. 16	8.2	30.0	22.0	8.0	6.0	5.0	1.0	11.0	0.10	10.0	12.0	70,000	4.3
Feb. 20	Feb. 22	6.8	28.0	21.0	7.0	8.0	6.0	2.0	11.0	0.20	10.0	18.0	60,000	3.1
Feb. 23	Feb. 25	7.3	39.0	30.0	9.0	8.0	7.0	1.0	13.0	0.20	12.0	22.0	60,000	3.3
Mar. 1	Mar. 3	7.8	23.5	21.0	2.5	9.0	8.0	1.0	10.0	0.20	12.0	19.0	120,000	3.3
Mar. 4	Mar. 6	7.3	27.5	21.5	6.0	5.0	3.0	2.0	11.0	0.30	12.0	21.0	100,000	3.7
Mar. 9	Mar. 11	8.2	33.0	23.5	9.5	11.0	7.5	3.5	8.5	0.20	15.0	20.0	120,000	3.5
Mar. 12	Mar. 14	8.8	22.0	18.0	4.0	8.0	7.0	1.0	9.0	0.30	23.0	17.0	70,000	3.3
Mar. 19	Mar. 24	9.4	21.0	14.0	7.0	8.0	6.0	2.0	12.0	0.60	20.0	19.0	140,000	3.1
Mar. 27	April 11	11.4	19.0	16.0	3.0	10.0	9.0	1.0	12.0	0.05	20.0	14.0	140,000	3.6
April 14	April 29	13.0	50.0	33.0	17.0	10.0	8.0	2.0	13.0	0.30	18.0	23.0	110,000	5.3
April 30	May 7	13.9	36.0	25.0	11.0	12.0	9.0	3.0	12.0	0.30	20.0	28.0	260,000	5.3

TABLE No. 13.

Period Covered 1907-8		Temp. Degrees Cent.	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			Susp'd Solids			Nitrogen as						Oxygen Consumed		
						Organic								
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates			
Effluent From Twelve-foot Sprinkling Filter 1" to 2" Stone.														
Aug. 1	Aug. 2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	---------	1.5
Aug. 3	Aug. 4	-----	17.0	12.0	5.0	1.0	0.0	1.0	13.0	1.00	6.0	6.0	---------	1.5
Aug. 5	Aug. 6	-----	12.5	3.0	9.5	9.0	7.0	2.0	9.0	1.80	8.0	17.0	270,000	1.5
Aug. 9	Aug. 10	-----	14.0	4.8	9.2	14.0	13.0	1.0	4.5	1.25	13.0	18.0	260,000	2.0
Aug. 11	Aug. 12	-----	16.8	11.8	5.0	11.0	10.0	1.0	4.0	2.75	15.0	9.0	200,000	1.7
Aug. 13	Aug. 14	-----	7.2	4.4	2.8	4.0	4.0	0.0	4.0	4.25	20.0	11.0	140,000	1.8
Aug. 19	Aug. 20	20.5	10.0	6.8	3.2	16.0	13.0	3.0	3.5	2.50	20.0	10.0	70,000	1.9
Aug. 21	Aug. 22	21.0	19.2	8.0	11.2	4.0	3.0	1.0	5.0	3.75	30.0	12.0	110,000	1.8
Aug. 23	Aug. 24	20.0	26.4	10.8	15.6	13.0	13.0	0.0	4.0	2.00	25.0	11.0	190,000	2.3
Aug. 27	Aug. 28	20.0	12.8	10.4	2.4	6.0	6.0	0.0	5.0	1.20	30.0	11.0	290,000	1.6
Aug. 29	Aug. 30	20.0	10.0	7.6	2.4	12.0	11.0	1.0	5.0	0.20	20.0	10.0	170,000	1.8
Aug. 31	Sept. 1	20.0	12.0	8.8	3.2	13.0	13.0	0.0	5.0	1.35	15.0	13.0	---------	2.6
Sept. 4	Sept. 5	22.0	51.0	3.9	12.0	7.0	6.0	1.0	7.0	1.80	20.0	18.0	---------	2.8
Sept. 6	Sept. 7	20.5	20.8	6.4	14.4	8.0	7.0	1.0	9.0	2.00	15.0	10.0	---------	3.1
Sept. 8	Sept. 9	22.0	27.2	14.4	12.8	9.0	9.0	0.0	9.0	1.20	15.0	17.0	---------	3.1
Sept. 14	Sept. 15	-----	33.6	11.6	22.0	10.0	10.0	0.0	11.0	2.40	15.0	12.0	---------	3.4
Sept. 16	Sept. 17	22.5	30.0	12.8	17.2	10.0	10.0	0.0	11.0	1.10	15.0	18.0	---------	3.5
Filter rested from September 20 to October 21, inclusive.														
Oct. 22	Oct. 23	15.0	43.0	24.0	19.0	12.0	-----	-----	19.0	1.00	7.0	24.0	---------	3.0
Oct. 24	Oct. 25	14.5	13.0	13.0	0.0	11.0	-----	-----	18.0	0.60	2.0	12.0	130,000	-------
Oct. 26	Oct. 27	-----	11.0	5.0	6.0	9.0	-----	-----	18.0	0.80	10.0	11.0	---------	4.3
Filter rested from October 30 to November 6, and November 16 to 20, inclusive.														
Nov. 21	Nov. 22	14.0	72.0	44.0	28.0	14.0	-----	-----	14.0	1.20	15.0	14.0	150,000	2.3
Nov. 23	Nov. 24	-----	62.0	34.0	28.0	11.0	-----	-----	7.5	0.70	15.0	12.0	90,000	4.0
Nov. 25	Nov. 26	12.0	52.0	26.0	26.0	11.0	-----	-----	7.5	1.00	20.0	23.0	240,000	4.0
Filter rested from November 29 to December 2, inclusive.														
Dec. 3	Dec. 4	7.0	160.0	86.0	74.0	19.0	-----	-----	19.0	0.70	20.0	35.0	120,000	2.7
Dec. 5	Dec. 6	8.5	122.0	56.0	66.0	16.0	-----	-----	12.0	0.50	15.0	28.0	150,000	2.6
Dec. 7	Dec. 8	-----	98.0	56.0	42.0	10.0	-----	-----	10.0	0.90	25.0	20.0	---------	2.8
Dec. 20	Dec. 21	9.0	35.0	19.0	16.0	12.0	10.0	2.0	9.0	0.40	20.0	15.0	80,000	-------
Dec. 22	Dec. 23	-----	65.0	34.0	31.0	11.0	3.5	7.5	7.5	0.30	25.0	15.0	---------	-------
Dec. 26	Dec. 27	9.5	38.0	26.0	12.0	12.0	10.0	2.0	11.0	0.60	20.0	14.0	180,000	3.4
Dec. 28	Dec. 29	11.0	39.0	27.0	12.0	12.0	11.0	1.0	10.0	0.40	20.0	15.0	190,000	2.8
Jan. 7	Jan. 9	7.3	37.0	22.0	15.0	11.0	6.5	4.5	8.5	0.60	12.0	16.0	90,000	4.6
Jan. 10	Jan. 12	7.0	38.0	31.0	7.0	6.0	5.0	1.0	8.0	0.40	12.0	14.0	70,000	3.9
Jan. 15	Jan. 17	8.0	38.0	36.0	2.0	7.5	6.5	1.0	6.5	1.30	15.0	16.0	80,000	3.5
Jan. 18	Jan. 20	9.0	46.0	32.0	14.0	7.0	7.0	0.0	10.0	0.10	18.0	18.0	100,000	3.2
Jan. 25	Jan. 27	4.5	36.0	29.0	7.0	9.0	6.0	3.0	10.0	0.20	15.0	14.0	160,000	3.8
Jan. 28	Jan. 30	7.0	43.0	34.0	9.0	6.0	5.0	1.0	8.0	0.10	15.0	14.0	140,000	3.0
Feb. 2	Feb. 4	5.0	32.0	31.0	1.0	8.0	5.0	3.0	9.0	0.80	15.0	22.0	110,000	3.8
Feb. 5	Feb. 7	5.2	35.0	23.0	12.0	12.0	9.0	3.0	10.0	0.20	18.0	20.0	80,000	3.2
Feb. 11	Feb. 13	7.2	64.0	41.0	23.0	10.0	7.0	3.0	8.0	0.30	12.0	20.0	120,000	4.1
Feb. 14	Feb. 16	8.0	27.0	16.0	11.0	7.5	6.5	1.0	7.5	0.00	15.0	13.0	80,000	4.3
Feb. 20	Feb. 22	6.8	32.0	24.0	8.0	8.0	6.0	2.0	8.0	0.10	15.0	15.0	110,000	3.1
Feb. 23	Feb. 25	7.3	26.0	22.0	4.0	9.0	8.0	1.0	9.0	0.10	18.0	18.0	---------	3.3
Mar. 1	Mar. 3	7.5	32.0	29.0	3.0	9.0	8.0	1.0	7.0	0.20	20.0	18.0	100,000	3.3
Mar. 4	Mar. 6	7.2	32.0	32.0	0.0	7.0	6.0	1.0	7.0	0.20	15.0	18.0	110,000	3.7
Mar. 9	Mar. 11	8.3	40.0	27.0	13.0	9.0	7.0	2.0	7.0	0.20	18.0	19.0	160,000	3.5
Mar. 12	Mar. 14	9.2	42.0	31.0	11.0	8.5	7.5	1.0	6.5	0.20	25.0	18.0	130,000	3.3
Mar. 19	Mar. 24	9.6	25.0	17.0	8.0	8.0	7.0	1.0	8.0	0.60	22.0	15.0	180,000	3.1
Mar. 27	April 11	11.6	46.0	38.0	8.0	13.0	11.0	2.0	8.0	0.05	25.0	17.0	130,000	3.6
April 14	April 29	13.3	65.0	40.0	25.0	10.0	9.0	1.0	9.0	0.10	22.0	23.0	120,000	5.3
April 30	May 7	13.6	50.0	32.0	18.0	11.0	9.0	2.0	8.0	0.10	25.0	25.0	160,000	5.3

TABLE No. 14.

Period Covered 1907-8		Temp. Degrees Cent.	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			Susp'd Solids			Nitrogen as						Oxygen Consumed		
						Organic			Free Ammonia	Nitrites	Nitrates			
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.						
Settled Effluent From Twelve-foot Sprinkling Filter 1″ to 2″ Stone.														
Aug. 1	Aug. 2	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	---------	1.5
Aug. 3	Aug. 4	-----	14.0	14.0	0.0	1.0	0.0	1.0	12.0	-----	-----	18.0	---------	1.5
Aug. 5	Aug. 6	-----	8.8	3.6	5.2	8.0	8.0	0.0	-----	-----	-----	17.0	280,000	1.5
Aug. 9	Aug. 10	-----	12.8	4.4	8.4	16.0	15.0	1.0	5.0	1.50	13.0	14.0	320,000	2.0
Aug. 11	Aug. 12	-----	14.8	9.6	5.2	8.5	7.5	1.0	4.5	1.38	15.0	7.0	130,000	1.7
Aug. 13	Aug. 14	-----	7.6	6.4	1.2	10.0	9.0	1.0	5.0	3.00	15.0	10.0	90,000	1.8
Aug. 19	Aug. 20	20.5	6.4	4.8	1.6	13.0	13.0	0.0	6.0	3.00	20.0	11.0	90,000	1.9
Aug. 21	Aug. 22	21.0	10.0	4.4	5.6	3.0	2.0	1.0	6.0	4.50	30.0	12.0	160,000	1.8
Aug. 23	Aug. 24	20.0	9.2	6.0	3.2	10.0	10.0	0.0	5.0	2.80	25.0	10.0	120,000	2.3
Aug. 27	Aug. 28	20.0	7.6	6.4	1.2	8.5	7.5	1.0	4.5	1.80	20.0	10.0	350,000	1.6
Aug. 29	Aug. 30	20.0	8.0	4.8	3.2	8.5	8.5	0.0	5.5	1.40	20.0	14.0	100,000	1.8
Aug. 31	Sept. 1	20.0	8.0	6.4	1.6	9.0	5.0	4.0	6.0	1.75	15.0	14.0	---------	2.6
Sept. 4	Sept. 5	22.0	15.0	7.0	8.0	6.5	5.5	1.0	7.5	1.70	15.0	13.0	---------	2.8
Sept. 6	Sept. 7	20.5	6.0	3.2	2.8	7.5	7.5	0.0	9.5	1.70	15.0	12.0	---------	3.1
Sept. 8	Sept. 9	22.0	15.6	8.8	6.8	9.0	9.0	0.0	10.0	1.30	15.0	12.0	---------	3.1
Sept. 14	Sept. 15	-----	18.0	7.6	10.4	10.0	10.0	0.0	11.0	2.20	15.0	11.0	---------	3.4
Sept. 16	Sept. 17	22.5	17.2	10.4	6.8	11.0	9.0	2.0	11.0	1.20	10.0	16.0	---------	3.5
Filter rested from September 20 to October 21, inclusive.														
Oct. 22	Oct. 23	15.0	56.0	42.0	14.0	14.0	-----	-----	18.0	2.20	8.0	21.0	---------	3.0
Oct. [illegible]	Oct. 25	14.5	15.0	14.0	1.0	10.0	-----	-----	20.0	0.60	2.0	11.0	160,000	-------
Oct. 26	Oct. 27	-----	8.0	4.0	4.0	8.0	-----	-----	19.0	0.80	9.0	11.0	---------	4.3
Filter rested from October 30 to November 6, and November 16 to 20, inclusive.														
Nov. 21	Nov. 22	14.0	48.0	20.0	28.0	13.0	-----	-----	14.0	1.20	15.0	11.0	150,000	2.3
Nov. 23	Nov. 24	-----	50.0	28.0	22.0	8.0	-----	-----	8.0	0.60	15.0	8.0	80,000	4.0
Nov. 25	Nov. 26	12.0	40.0	20.0	20.0	12.0	-----	-----	7.5	0.80	20.0	12.0	100,000	4.0
Filter rested from November 29 to December 2, inclusive.														
Dec. 3	Dec. 4	7.0	76.0	44.0	32.0	12.0	-----	-----	19.0	0.80	20.0	26.0	70,000	2.7
Dec. 5	Dec. 6	8.5	54.0	24.0	30.0	12.0	-----	-----	12.0	0.60	20.0	17.0	90,000	2.6
Dec. 7	Dec. 8	-----	70.0	32.0	38.0	10.0	-----	-----	10.0	0.70	30.0	13.0	---------	2.8
Dec. 20	Dec. 21	9.0	15.0	9.0	6.0	10.0	9.0	1.0	9.0	0.40	20.0	12.0	50,000	-------
Dec. 22	Dec. 23	-----	37.0	18.0	19.0	8.0	4.0	4.0	8.0	0.40	15.0	12.0	---------	-------
Dec. 26	Dec. 27	9.5	23.0	18.0	5.0	9.0	8.0	1.0	10.0	0.60	18.0	13.0	140,000	3.4
Dec. 28	Dec. 29	11.0	29.0	17.0	12.0	10.0	9.0	1.0	9.0	0.40	20.0	12.0	150,000	2.8
Jan. 7	Jan. 9	7.3	27.0	21.0	6.0	12.0	6.5	5.5	8.5	0.40	12.0	12.0	100,000	4.6
Jan. 10	Jan. 12	7.0	32.0	20.0	12.0	5.0	5.0	0.0	8.0	0.40	12.0	12.0	60,000	3.9
Jan. 15	Jan. 17	8.0	28.0	26.0	2.0	7.0	6.0	1.0	7.0	1.10	15.0	12.0	60,000	3.5
Jan. 18	Jan. 20	9.0	38.0	24.0	14.0	7.0	6.0	1.0	10.0	0.10	18.0	17.0	120,000	3.2
Jan. 25	Jan. 27	4.5	32.0	25.0	7.0	7.0	5.0	2.0	11.0	0.20	15.0	12.0	150,000	3.8
Jan. 28	Jan. 30	7.0	35.0	28.0	7.0	6.5	5.5	1.0	7.5	0.40	15.0	13.0	110,000	3.0
Feb. 2	Feb. 4	5.0	30.0	22.0	8.0	7.5	6.5	1.0	9.5	0.10	15.0	21.0	270,000	3.8
Feb. 5	Feb. 7	5.2	20.0	18.0	2.0	8.0	7.0	1.0	10.0	0.10	18.0	19.0	60,000	3.2
Feb. 11	Feb. 13	7.2	38.0	28.0	10.0	8.5	7.5	1.0	7.5	0.20	12.0	14.0	110,000	4.1
Feb. 14	Feb. 16	8.0	22.0	14.0	8.0	7.0	6.0	1.0	8.0	0.05	15.0	13.0	110,000	4.3
Feb. 20	Feb. 22	6.8	52.0	22.0	30.0	7.5	7.5	0.0	7.5	0.10	15.0	15.0	80,000	3.1
Feb. 23	Feb. 25	7.3	36.0	24.0	12.0	7.0	6.0	1.0	9.0	0.30	18.0	14.0	70,000	3.3
Mar. 1	Mar. 3	7.5	24.0	17.5	6.5	9.0	8.0	1.0	7.0	0.10	20.0	17.0	90,000	3.3
Mar. 4	Mar. 6	7.2	25.5	19.0	6.5	7.5	6.5	1.0	6.5	0.20	15.0	13.0	90,000	3.7
Mar. 9	Mar. 11	8.3	37.5	18.5	19.0	9.0	7.0	2.0	7.0	0.20	18.0	17.0	120,000	3.5
Mar. 12	Mar. 14	9.2	26.0	20.0	6.0	8.0	7.0	1.0	6.0	0.30	25.0	15.0	80,000	3.3
Mar. 19	Mar. 24	9.6	27.0	15.0	12.0	8.0	7.0	1.0	8.0	0.20	20.0	12.0	150,000	3.1
Mar. 27	April 11	11.6	35.0	28.0	7.0	11.0	11.0	0.0	8.0	0.20	25.0	14.0	100,000	3.6
April 14	April 29	13.3	45.0	26.0	19.0	10.0	9.0	1.0	9.0	0.20	20.0	19.0	100,000	5.3
April 30	May 7	13.6	37.0	23.0	14.0	9.0	9.0	0.0	8.0	0.10	25.0	20.0	270,000	5.3

TABLE No. 15.

PERIOD COVERED 1907-8		TEMP. DEGREES CENT.	PARTS PER MILLION										BACTERIA PER C. C.	Rate of Filtration Million Gallons per Acre per Day
			SUSP'D SOLIDS			NITROGEN AS						Oxygen Consumed		
						ORGANIC								
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates			
EFFLUENT FROM SIX-FOOT SPRINKLING FILTER 2" TO 4" STONE.														
Sept. 20	Sept. 21	22.0	32.0	31.0	1.0	14.0	12.0	2.0	17.0	0.20	0.5	21.0	3,600,000	3.5
Sept. 22	Sept. 23	-----	38.0	38.0	0.0	11.0	10.0	1.0	17.0	0.90	1.0	11.0	---------	3.0
Sept. 24	Sept. 25	19.5	27.0	18.0	9.0	18.0	18.0	0.0	11.0	0.70	5.0	17.0	1,500,000	3.8
Sept. 28	Sept. 29	-----	20.0	15.0	5.0	9.0	8.0	1.0	16.0	1.00	5.0	13.0	980,000	3.9
Sept. 30	Oct. 1	19.0	52.0	37.0	15.0	13.0	13.0	0.0	16.0	0.40	0.0	26.0	110,000	3.7
Oct. 2	Oct. 3	19.0	48.0	36.0	12.0	13.0	12.0	1.0	19.0	0.20	0.0	18.0	---------	3.7
Oct. 6	Oct. 7	19.0	168.0	78.0	90.0	16.0	13.0	3.0	23.0	0.00	0.0	34.0	1,900,000	1.4
Oct. 8	Oct. 9	17.0	144.0	80.0	64.0	12.0	8.0	4.0	19.0	0.80	0.0	31.0	610,000	2.4
Oct. 10	Oct. 11	17.5	120.0	58.0	62.0	11.0	8.0	3.0	22.0	0.60	2.0	28.0	400,000	3.3
Filter rested from October 22 to 29, inclusive.														
Oct. 30	Oct. 31	-----	122.0	70.0	52.0	16.0	-----	-----	24.0	0.10	0.0	28.0	350,000	4.1
Nov. 1	Nov. 2	-----	70.0	44.0	26.0	17.0	-----	-----	21.0	1.00	2.0	28.0	450,000	3.8
Nov. 3	Nov. 4	13.0	78.0	52.0	26.0	14.0	-----	-----	24.0	0.60	2.0	32.0	400,000	------
Filter rested from November 7 to 14, inclusive.														
Nov. 15	Nov. 16	8.0	84.0	52.0	32.0	28.0	-----	-----	26.0	0.70	3.0	37.0	380,000	4.2
Nov. 17	Nov. 18	12.0	124.0	102.0	22.0	16.0	-----	-----	23.0	1.10	0.0	31.0	640,000	3.9
Nov. 29	----- --	12.0	116.0	82.0	34.0	16.0	-----	-----	23.0	0.60	2.0	35.0	---------	3.8
Dec. 11	Dec. 12	10.0	76.0	50.0	26.0	14.0	-----	-----	19.0	1.50	1.0	22.0	320,000	5.2
Dec. 13	Dec. 14	11.0	40.0	32.0	8.0	17.0	-----	-----	15.0	0.50	7.0	19.0	290,000	2.8
Dec. 15	Dec. 16	12.0	36.0	20.0	16.0	16.0	-----	-----	18.0	0.60	7.0	22.0	---------	3.1
Jan. 6	Jan. 8	6.3	51.0	36.0	15.0	10.0	7.0	3.0	16.0	0.40	4.0	39.0	260,000	4.5
Jan. 9	Jan. 11	6.0	37.0	33.0	4.0	6.0	5.0	1.0	15.0	0.40	4.0	20.0	---------	3.8
Jan. 16	Jan. 18	8.0	34.0	33.0	1.0	9.0	8.0	1.0	15.0	0.10	6.0	26.0	---------	3.4
Jan. 19	Jan. 21	9.0	85.0	74.0	11.0	11.0	9.0	2.0	20.0	0.00	4.0	35.0	---------	3.2
Feb. 3	Feb. 5	5.2	52.0	40.0	12.0	11.0	9.0	2.0	18.0	0.20	5.0	38.0	470,000	3.4
Feb. 6	Feb. 8	6.3	46.0	40.0	6.0	12.0	10.0	2.0	16.0	0.40	3.0	30.0	---------	3.4
Feb. 12	Feb. 14	7.7	40.0	28.0	12.0	9.0	7.0	2.0	13.0	0.30	2.0	25.0	300,000	4.4
Feb. 15	Feb. 17	7.8	62.0	50.0	12.0	11.0	9.0	2.0	16.0	0.40	4.0	32.0	340,000	4.1
Feb. 21	Feb. 23	6.5	44.0	32.0	12.0	8.0	7.0	1.0	17.0	0.20	5.0	28.0	---------	2.9
Feb. 24	Feb. 26	6.7	48.0	39.0	9.0	11.0	9.0	2.0	12.0	0.20	5.0	28.0	440,000	3.8
Feb. 29	Mar. 2	8.0	63.0	50.0	13.0	11.0	8.0	3.0	17.0	0.40	3.0	29.0	---------	3.3
Mar. 3	Mar. 5	7.8	44.0	36.0	8.0	12.0	10.0	2.0	15.0	0.20	3.0	30.0	120,000	3.1
Mar. 10	Mar. 12	7.5	55.0	44.0	11.0	12.0	10.0	2.0	14.0	0.30	3.0	29.0	---------	3.3
Mar. 13	Mar. 15	9.0	48.0	42.0	6.0	10.0	7.0	3.0	16.0	0.10	7.0	26.0	---------	3.2
Mar. 18	Mar. 23	8.6	47.0	38.0	9.0	13.0	11.0	2.0	14.0	0.20	5.0	25.0	310,000	3.1
Mar. 28	April 10	10.9	52.0	50.0	2.0	18.0	16.0	2.0	18.0	0.40	2.0	28.0	300,000	3.6
May 25	May 26	18.0	123.0	105.0	18.0	15.0	12.0	3.0	13.0	0.20	1.0	102.0	---------	------
July 13	July 25	22.1	57.0	42.0	15.0	9.0	6.0	3.0	13.0	0.80	2.0	22.0	570,000	5.4
July 27	Aug. 8	22.6	66.0	47.0	19.0	7.0	5.0	2.0	12.0	1.20	5.0	24.0	500,000	4.9
Sept. 7	Sept. 19	19.5	32.0	28.0	4.0	10.0	9.0	1.0	17.0	0.60	1.0	22.0	400,000	4.8
Sept. 21	Oct. 3	19.2	47.0	39.0	8.0	7.0	5.0	2.0	16.0	0.40	2.5	25.0	450,000	5.2

TABLE No 16.

PERIOD COVERED 1907-8		TEMP. DEGREES CENT.	PARTS PER MILLION										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			SUSP'D SOLIDS			NITROGEN AS						Oxygen Consumed		
						ORGANIC								
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates			
SETTLED EFFLUENT FROM SIX-FOOT SPRINKLING FILTER 2″ TO 4″ STONE.														
Sept. 20	Sept. 21	22.0	21.0	15.0	6.0	12.0	12.0	0.0	17.0	0.08	0.0	18.0	3,800,000	3.5
Sept. 22	Sept. 23	-----	34.0	28.0	6.0	12.0	11.0	1.0	17.0	1.20	3.0	9.0	---------	3.0
Sept. 24	Sept. 25	19.5	24.0	16.0	8.0	18.0	18.0	0.0	11.0	0.70	4.0	16.0	1,000,000	3.8
Sept. 28	Sept. 29	-----	12.0	6.0	6.0	12.0	9.0	3.0	16.0	1.00	5.0	8.0	560,000	3.9
Sept. 30	Oct. 1	19.0	36.0	30.0	6.0	17.0	15.0	2.0	14.0	0.50	1.0	20.0	110,000	3.7
Oct. 2	Oct. 3	19.0	35.0	29.0	6.0	12.0	10.0	2.0	19.0	0.20	0.0	12.0	---------	3.7
Oct. 6	Oct. 7	19.0	61.0	42.0	19.0	12.0	8.0	4.0	22.0	0.40	1.0	20.0	230,000	1.4
Oct. 8	Oct. 9	17.0	58.0	39.0	19.0	9.0	6.0	3.0	20.0	0.60	0.0	18.0	320,000	2.4
Oct. 10	Oct. 11	17.5	36.0	26.0	10.0	7.0	3.0	4.0	23.0	0.60	2.0	17.0	330,000	3.3
Filter rested from October 22 to 29, inclusive.														
Oct. 30	Oct. 31	-----	114.0	68.0	46.0	17.0	-----	-----	25.0	0.10	0.0	21.0	240,000	4.1
Nov. 1	Nov. 2	-----	59.0	37.0	22.0	14.0	-----	-----	23.0	0.70	2.0	22.0	350,000	3.8
Nov. 3	Nov. 4	13.0	46.0	28.0	18.0	13.0	-----	-----	24.0	0.60	2.0	30.0	640,000	------
Filter rested from November 7 to 14, inclusive.														
Nov. 15	Nov. 16	8.0	56.0	36.0	20.0	23.0	-----	-----	25.0	1.40	3.0	25.0	340,000	4.2
Nov. 17	Nov. 18	12.0	48.0	32.0	16.0	11.0	-----	-----	23.0	0.60	0.0	24.0	490,000	3.9
Nov. 29	----- --	12.0	34.0	28.0	6.0	16.0	-----	-----	22.0	0.40	3.0	22.0	---------	3.8
Dec. 11	Dec. 12	10.0	74.0	44.0	30.0	12.0	-----	-----	19.0	0.80	2.0	17.0	260,000	5.2
Dec. 13	Dec. 14	11.0	16.0	14.0	2.0	17.0	-----	-----	17.0	0.50	6.0	17.0	210,000	2.8
Dec. 15	Dec. 16	12.0	20.0	6.0	14.0	7.0	-----	-----	17.0	0.60	7.0	21.0	---------	3.7
Jan. 6	Jan. 8	6.3	22.0	16.0	6.0	12.0	7.0	5.0	16.0	0.60	4.0	20.0	110,000	4.5
Jan. 9	Jan. 11	6.0	25.0	21.0	4.0	5.0	4.0	1.0	16.0	0.40	4.0	15.0	---------	3.8
Jan. 16	Jan. 18	8.0	24.0	22.0	2.0	9.0	8.0	1.0	15.0	0.10	6.0	19.0	---------	3.4
Jan. 19	Jan. 21	9.0	27.0	25.0	2.0	11.0	7.0	4.0	19.0	0.00	4.0	27.0	---------	3.2
Feb. 3	Feb. 5	5.2	33.0	27.0	6.0	10.0	8.0	2.0	18.0	0.20	5.0	33.0	540,000	3.4
Feb. 6	Feb. 8	6.3	19.0	16.0	3.0	10.0	8.0	2.0	18.0	0.30	3.0	27.0	---------	3.4
Feb. 12	Feb. 14	7.7	28.0	16.0	12.0	9.0	8.0	1.0	14.0	0.40	2.0	20.0	280,000	4.4
Feb. 15	Feb. 17	7.8	54.0	40.0	14.0	10.0	8.0	2.0	16.0	0.60	4.0	32.0	350,000	4.1
Feb. 21	Feb. 23	6.5	26.0	20.0	6.0	8.0	5.0	3.0	17.0	0.15	5.0	21.0	---------	2.9
Feb. 24	Feb. 26	6.7	30.0	26.0	4.0	10.0	9.0	1.0	12.0	0.20	5.0	24.0	280,000	3.8
Feb. 29	Mar. 2	8.0	25.0	19.0	6.0	10.0	7.0	3.0	17.0	0.50	3.0	25.0	---------	[illegible]
Mar. 3	Mar. 5	7.8	31.0	29.0	2.0	13.0	10.0	3.0	16.0	0.20	4.0	23.0	220,000	3.1
Mar. 10	Mar. 12	7.5	39.0	26.0	13.0	11.0	9.0	2.0	14.0	0.30	3.0	25.0	---------	3.3
Mar. 13	Mar. 15	9.0	26.0	25.0	1.0	7.0	5.0	2.0	17.0	0.20	7.0	22.0	---------	3.2
Mar. 18	Mar. 23	8.6	29.0	25.0	4.0	12.0	10.0	2.0	15.0	0.20	5.0	18.0	260,000	3.1
Mar. 28	April 10	10.9	42.0	42.0	0.0	18.0	16.0	2.0	18.0	0.20	2.0	21.0	270,000	3.6
May 25	May 26	18.0	68.0	50.0	18.0	13.0	11.0	2.0	13.0	0.20	1.0	62.0	---------	------
July 13	July 25	22.1	28.0	25.0	3.0	8.0	6.0	2.0	13.0	0.80	3.0	14.0	410,000	5.4
July 27	Aug. 8	22.6	38.0	23.0	15.0	6.0	4.0	2.0	12.0	1.10	5.0	13.0	620,000	4.9
Sept. 7	Sept. 19	19.5	22.0	20.0	2.0	9.0	8.0	1.0	17.0	0.50	2.0	18.0	390,000	4.8
Sept. 21	Oct. 3	19.2	30.0	25.0	5.0	6.0	5.0	1.0	16.0	0.40	2.5	19.0	400,000	5.2

TABLE No. 17.

Period Covered 1907-8		Temp. Degrees Cent.	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			Susp'd Solids			Nitrogen as						Oxygen Consumed		
						Organic								
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates			
Effluent From Nine-foot Sprinkling Filter 2″ to 4″ Stone.														
Sept. 20	Sept. 21	20.0	21.0	12.0	9.0	13.0	12.0	1.0	16.0	0.18	0.8	13.0	3,800,000	3.5
Sept. 22	Sept. 23	-----	31.0	26.0	5.0	13.0	10.0	3.0	16.0	1.20	4.0	8.0	---------	3.0
Sept. 24	Sept. 25	19.5	27.0	19.0	8.0	18.0	17.0	1.0	11.0	0.90	5.0	12.0	800,000	3.8
Sept. 28	Sept. 29	-----	44.0	22.0	22.0	17.0	15.0	2.0	14.0	1.40	8.0	11.0	400,000	3.9
Sept. 30	Oct. 1	19.0	70.0	38.0	32.0	16.0	14.0	2.0	14.0	1.00	1.0	20.0	1,000,000	3.7
Oct. 2	Oct. 3	17.0	51.0	35.0	16.0	15.0	9.0	6.0	17.0	1.10	4.0	14.0	---------	3.7
Oct. 6	Oct. 7	18.0	91.0	47.0	44.0	9.0	7.0	2.0	21.0	1.80	4.0	21.0	480,000	1.4
Oct. 8	Oct. 9	17.0	108.0	68.0	40.0	10.0	6.0	4.0	17.0	1.10	4.0	21.0	260,000	2.4
Oct. 10	Oct. 11	17.0	52.0	30.0	22.0	6.0	6.0	0.0	20.0	1.20	5.0	16.0	250,000	3.3
Filter rested from October 22 to 29, inclusive.														
Oct. 30	Oct. 31	-----	152.0	84.0	68.0	19.0	-----	-----	21.0	0.10	0.0	28.0	360,000	4.1
Nov. 1	Nov. 2	-----	100.0	46.0	54.0	13.0	-----	-----	20.0	0.80	4.0	25.0	330,000	3.8
Nov. 3	Nov. 4	13.0	120.0	64.0	56.0	14.0	-----	-----	22.0	1.00	5.0	28.0	990,000	-------
Filter rested from November 7 to 14, inclusive.														
Nov. 15	Nov. 16	7.0	100.0	64.0	36.0	29.0	-----	-----	24.0	0.80	4.0	26.0	370,000	4.2
Nov. 17	Nov. 18	11.0	72.0	40.0	32.0	9.0	-----	-----	23.0	0.50	1.0	21.0	740,000	3.9
Nov. 29	----- --	11.0	52.0	42.0	10.0	13.0	-----	-----	21.0	0.60	7.0	22.0	---------	3.8
Dec. 11	Dec. 12	8.8	62.0	50.0	12.0	13.0	-----	-----	16.0	1.20	4.0	15.0	300,000	5.2
Dec. 13	Dec. 14	8.0	38.0	22.0	16.0	22.0	-----	-----	14.0	0.50	9.0	17.0	270,000	2.8
Dec. 15	Dec. 16	8.0	34.0	12.0	22.0	6.0	-----	-----	15.0	0.60	9.0	16.0	---------	3.7
Jan. 6	Jan. 8	7.3	160.0	119.0	41.0	13.0	8.0	5.0	15.0	0.50	7.0	30.0	80,000	4.5
Jan. 9	Jan. 11	6.5	21.5	17.5	4.0	7.0	7.0	0.0	13.0	0.30	10.0	17.0	---------	3.8
Jan. 16	Jan. 18	7.0	21.0	20.0	1.0	9.0	8.0	1.0	12.0	0.10	10.0	17.0	---------	3.4
Jan. 19	Jan. 21	8.5	76.0	66.0	10.0	9.0	7.0	2.0	16.0	0.20	9.0	23.0	---------	3.2
Feb. 3	Feb. 5	4.3	42.0	34.0	8.0	8.0	6.0	2.0	16.0	0.20	10.0	29.0	450,000	3.4
Feb. 6	Feb. 8	5.2	34.0	30.0	4.0	9.0	7.0	2.0	16.0	0.10	7.0	24.0	---------	3.4
Feb. 12	Feb. 14	7.5	46.0	32.0	14.0	8.0	6.0	2.0	12.0	0.40	8.0	16.0	290,000	4.4
Feb. 15	Feb. 17	7.3	66.0	50.0	16.0	10.0	7.0	3.0	13.0	0.40	10.0	27.0	190,000	4.1
Feb. 21	Feb. 23	6.5	40.0	32.0	8.0	7.0	5.0	2.0	13.0	0.10	10.0	26.0	---------	2.9
Feb. 24	Feb. 26	6.7	42.0	35.0	7.0	10.0	8.0	2.0	10.0	0.15	8.0	19.0	930,000	3.8
Feb. 29	Mar. 2	8.0	52.0	40.0	12.0	10.0	9.0	1.0	13.0	0.40	10.0	21.0	---------	3.3
Mar. 3	Mar. 5	7.5	39.0	32.0	7.0	8.0	6.0	2.0	13.0	0.30	8.0	19.0	230,000	3.1
Mar. 10	Mar. 12	7.5	64.0	44.0	20.0	11.0	8.0	3.0	11.0	0.40	10.0	23.0	---------	3.3
Mar. 13	Mar. 15	9.0	75.0	56.0	19.0	8.0	7.0	1.0	13.0	0.20	20.0	29.0	---------	3.2
Mar. 18	Mar. 23	8.8	150.0	110.0	40.0	24.0	22.0	2.0	12.0	0.20	12.0	29.0	210,000	3.1
Mar. 28	April 10	10.9	156.0	124.0	32.0	23.0	17.0	6.0	15.0	0.40	15.0	28.0	400,000	3.6
May 25	May 26	18.0	61.0	53.0	8.0	14.0	12.0	2.0	11.0	0.40	5.0	66.0	---------	-------
July 13	July 25	22.1	51.0	39.0	12.0	8.0	6.0	2.0	10.0	1.60	8.0	13.0	640,000	5.4
July 27	Aug. 8	22.6	32.0	27.0	5.0	7.5	3.5	4.0	7.5	1.80	9.0	13.0	690,000	4.9
Sept. 7	Sept. 19	19.5	34.0	31.0	3.0	11.0	9.0	2.0	14.0	0.20	10.0	21.0	580,000	4.8
Sept. 21	Oct. 3	19.1	37.0	27.0	10.0	5.0	4.0	1.0	13.0	0.60	16.0	18.0	360,000	5.2

TABLE No. 18.

Period Covered 1907-8		Temp. Degrees Cent.	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			Susp'd Solids			Nitrogen as						Oxygen Consumed		
						Organic								
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates			
Settled Effluent From Nine-foot Sprinkling Filter 2″ to 4″ Stone.														
Sept. 20	Sept. 21	20.0	17.0	12.0	5.0	12.0	10.0	2.0	16.0	0.13	1.5	17.0	3,800,000	3.5
Sept. 22	Sept. 23	-----	27.0	22.0	5.0	11.0	11.0	0.0	16.0	1.00	5.0	7.0	---------	3.0
Sept. 24	Sept. 25	19.5	15.0	8.0	7.0	17.0	17.0	0.0	11.0	1.00	5.0	13.0	650,000	3.8
Sept. 28	Sept. 29	-----	14.0	14.0	0.0	17.0	12.0	5.0	14.0	1.40	6.0	8.0	390,000	3.9
Sept. 30	Oct. 1	19.0	33.0	20.0	13.0	12.0	12.0	0.0	14.0	0.90	3.0	22.0	150,000	3.7
Oct. 2	Oct. 3	17.0	78.0	69.0	9.0	11.0	8.0	3.0	18.0	0.80	3.0	11.0	---------	3.7
Oct. 6	Oct. 7	18.0	45.0	34.0	11.0	9.0	8.0	1.0	20.0	0.80	5.0	19.0	580,000	1.4
Oct. 8	Oct. 9	17.0	44.0	30.0	14.0	9.0	6.0	3.0	17.0	1.20	5.0	18.0	200,000	2.4
Oct. 10	Oct. 11	17.0	28.0	19.0	9.0	5.0	5.0	0.0	19.0	1.30	6.0	15.0	250,000	3.3
Filter rested from October 22 to 29, inclusive.														
Oct. 30	Oct. 31	-----	96.0	60.0	36.0	17.0	-----	-----	21.0	0.40	0.0	27.0	290,000	4.1
Nov. 1	Nov. 2	-----	58.0	36.0	22.0	12.0	-----	-----	20.0	0.80	4.0	20.0	200,000	3.8
Nov. 3	Nov. 4	13.0	40.0	26.0	14.0	14.0	-----	-----	21.0	1.00	5.0	22.0	340,000	-------
Filter rested from November 7 to 14, inclusive.														
Nov. 15	Nov. 16	7.0	140.0	76.0	64.0	22.0	-----	-----	24.0	2.80	4.0	30.0	410,000	4.2
Nov. 17	Nov. 18	11.0	50.0	26.0	24.0	18.0	-----	-----	22.0	0.60	1.0	23.0	450,000	3.9
Nov. 29	----- --	11.0	36.0	30.0	6.0	11.0	-----	-----	21.0	0.60	8.0	21.0	---------	3.8
Dec. 11	Dec. 12	8.3	34.0	30.0	4.0	10.0	-----	-----	16.0	0.60	3.0	15.0	170,000	5.2
Dec. 13	Dec. 14	8.0	22.0	14.0	8.0	21.0	-----	-----	14.0	0.40	5.0	14.0	170,000	2.8
Dec. 15	Dec. 16	8.0	22.0	6.0	16.0	5.0	-----	-----	16.0	0.70	7.0	16.0	---------	3.7
Jan. 6	Jan. 8	7.3	26.0	22.0	4.0	8.0	6.0	2.0	16.0	0.40	7.0	22.0	130,000	4.5
Jan. 9	Jan. 11	6.5	16.0	11.0	5.0	7.0	7.0	0.0	13.0	0.60	8.0	13.0	---------	3.8
Jan. 16	Jan. 18	7.0	15.0	12.0	3.0	11.0	9.0	2.0	11.0	1.50	10.0	16.0	---------	3.4
Jan. 19	Jan. 21	8.5	20.0	18.0	2.0	10.0	7.0	3.0	15.0	0.10	9.0	21.0	---------	3.2
Feb. 3	Feb. 5	4.3	26.0	22.0	4.0	10.0	9.0	1.0	15.0	0.20	10.0	30.0	200,000	3.4
Feb. 6	Feb. 8	5.2	28.0	27.0	1.0	7.0	6.0	1.0	16.0	0.10	7.0	23.0	---------	3.4
Feb. 12	Feb. 14	7.5	24.5	17.0	7.5	8.0	7.0	1.0	11.0	0.40	8.0	15.0	180,000	4.4
Feb. 15	Feb. 17	7.3	28.5	20.5	8.0	10.0	8.0	2.0	13.0	0.60	8.0	25.0	330,000	4.1
Feb. 21	Feb. 23	6.5	21.0	14.0	7.0	8.0	7.0	1.0	13.0	0.80	12.0	24.0	---------	2.9
Feb. 24	Feb. 26	6.7	26.5	19.0	7.5	8.0	7.0	1.0	10.0	0.10	7.0	20.0	180,000	3.8
Feb. 29	Mar. 2	8.0	22.0	15.5	6.5	7.0	6.0	1.0	14.0	0.30	10.0	21.0	---------	3.3
Mar. 3	Mar. 5	7.5	20.0	14.5	5.5	8.0	6.0	2.0	13.0	0.40	8.0	19.0	140,000	3.1
Mar. 10	Mar. 12	7.5	23.0	15.5	7.5	10.0	7.0	3.0	11.0	0.30	10.0	20.0	---------	3.3
Mar. 13	Mar. 14	9.0	23.5	20.0	3.5	8.0	7.0	1.0	13.0	0.20	15.0	20.0	---------	3.2
Mar. 18	Mar. 23	8.8	38.0	28.0	10.0	12.0	10.0	2.0	12.0	0.20	15.0	19.0	160,000	3.1
Mar. 28	April 10	10.9	42.0	30.0	12.0	21.0	15.0	6.0	15.0	0.30	10.0	19.0	170,000	3.6
May 25	May 26	18.0	49.0	46.0	3.0	13.0	11.0	2.0	11.0	0.20	2.0	62.0	---------	-------
July 13	July 25	22.1	27.0	20.0	7.0	7.0	6.0	1.0	10.0	1.30	8.0	14.0	230,000	5.4
July 27	Aug. 8	22.6	21.0	21.0	0.0	3.5	2.5	1.0	7.5	1.80	9.0	14.0	300,000	4.9
Sept. 7	Sept. 19	19.5	17.0	16.0	1.0	8.0	7.0	1.0	14.0	0.20	9.0	19.0	230,000	4.8
Sept. 21	Oct. 3	19.1	24.0	20.0	4.0	5.0	4.0	1.0	12.0	0.60	15.0	18.0	300,000	5.2

TABLE No. 19.

Period Covered 1907-8		Temp. Degrees Cent.	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			Susp'd Solids			Nitrogen as						Oxygen Consumed		
						Organic								
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates			
Effluent From Twelve-foot Sprinkling Filter 2″ to 4″ Stone.														
Sept. 20	Sept. 21	20.0	45.0	28.0	17.0	13.0	10.0	3.0	16.0	0.25	1.0	20.0	4,800,000	3.5
Sept. 22	Sept. 23	-----	46.0	33.0	13.0	17.0	14.0	3.0	16.0	1.30	5.0	10.0	---------	3.0
Sept. 24	Sept. 25	19.5	33.0	19.0	14.0	18.0	17.0	1.0	11.0	0.90	5.0	12.0	550,000	3.8
Sept. 28	Sept. 29	-----	31.0	21.0	10.0	12.0	9.0	3.0	13.0	1.60	6.0	9.0	420,000	3.9
Sept. 30	Oct. 1	19.0	57.0	27.0	30.0	13.0	12.0	1.0	12.0	1.20	3.0	16.0	160,000	3.7
Oct. 2	Oct. 3	16.0	60.0	32.0	28.0	11.0	11.0	0.0	15.0	1.20	5.0	15.0	---------	3.7
Oct. 6	Oct. 7	18.0	88.0	49.0	39.0	9.0	7.0	2.0	18.0	1.80	5.0	24.0	190,000	1.4
Oct. 8	Oct. 9	18.0	92.0	48.0	44.0	9.0	6.0	3.0	16.0	1.20	5.0	20.0	180,000	2.4
Oct. 10	Oct. 11	16.5	48.0	24.0	24.0	5.0	4.0	1.0	18.0	1.60	9.0	18.0	210,000	3.3
Filter rested from October 22 to 29, inclusive.														
Oct. 30	Oct. 31	-----	102.0	74.0	28.0	17.0	-----	-----	20.0	0.20	0.0	24.0	260,000	4.1
Nov. 1	Nov. 2	-----	76.0	38.0	38.0	13.0	-----	-----	18.0	1.60	4.0	18.0	340,000	3.8
Nov. 3	Nov. 4	13.0	60.0	32.0	28.0	13.0	-----	-----	20.0	1.00	5.0	26.0	490,000	------
Filter rested from November 7 to 14, inclusive.														
Nov. 15	Nov. 16	7.0	140.0	76.0	64.0	24.0	-----	-----	23.0	4.40	9.0	31.0	350,000	4.2
Nov. 17	Nov. 18	11.0	76.0	38.0	38.0	10.0	-----	-----	20.0	0.80	1.0	20.0	430,000	3.9
Nov. 29	----- --	11.0	50.0	30.0	20.0	11.0	-----	-----	19.0	0.50	15.0	19.0	---------	3.8
Dec. 11	Dec. 12	9.0	48.0	38.0	10.0	12.0	-----	-----	15.0	0.80	7.0	15.0	210,000	5.2
Dec. 13	Dec. 14	9.0	30.0	20.0	10.0	17.0	-----	-----	13.0	0.40	8.0	12.0	220,000	2.8
Dec. 15	Dec. 16	9.0	32.0	10.0	22.0	8.0	-----	-----	13.0	0.60	12.0	15.0	---------	3.7
Jan. 6	Jan. 8	5.0	48.0	34.0	14.0	9.0	7.0	2.0	12.0	0.40	12.0	23.0	250,000	4.5
Jan. 9	Jan. 11	6.5	19.0	10.5	8.5	12.0	12.0	0.0	8.5	0.30	12.0	13.0	---------	3.8
Jan. 16	Jan. 18	7.0	26.0	24.0	2.0	9.5	6.5	3.0	9.5	0.00	15.0	14.0	---------	3.4
Jan. 19	Jan. 21	8.0	33.0	30.0	3.0	2.0	2.0	0.0	19.0	0.20	15.0	19.0	---------	3.2
Feb. 3	Feb. 5	4.7	46.0	41.0	5.0	7.0	6.0	1.0	15.0	0.30	12.0	30.0	250,000	3.4
Feb. 6	Feb. 8	4.8	31.0	26.0	5.0	7.0	6.0	1.0	14.0	0.10	8.0	21.0	---------	3.4
Feb. 12	Feb. 14	7.3	36.0	22.0	14.0	8.0	6.0	2.0	11.0	0.30	10.0	16.0	210,000	4.4
Feb. 15	Feb. 17	7.5	50.0	36.0	14.0	9.0	8.0	1.0	13.0	0.40	10.0	25.0	180,000	4.1
Feb. 21	Feb. 23	6.0	36.0	24.0	12.0	8.0	6.0	2.0	12.0	0.15	12.0	22.0	---------	2.9
Feb. 24	Feb. 26	6.7	37.0	31.0	6.0	8.5	7.5	1.0	7.5	0.10	10.0	19.0	330,000	3.8
Feb. 29	Mar. 2	7.5	24.0	20.0	4.0	7.0	6.0	1.0	13.0	0.40	12.0	18.0	---------	3.8
Mar. 3	Mar. 5	7.5	26.0	21.0	5.0	9.0	8.0	1.0	11.0	0.20	12.0	20.0	240,000	3.1
Mar. 10	Mar. 12	7.3	45.0	29.0	16.0	9.0	8.0	1.0	10.0	0.20	12.0	20.0	---------	3.3
Mar. 13	Mar. 15	7.0	66.0	48.0	18.0	9.0	8.0	1.0	12.0	0.20	20.0	26.0	---------	3.2
Mar. 18	Mar. 23	8.8	78.0	63.0	15.0	13.0	11.0	2.0	10.0	0.20	15.0	24.0	160,000	3.1
Mar. 28	April 10	11.1	56.0	46.0	10.0	21.0	19.0	2.0	11.0	0.40	20.0	22.0	180,000	3.6
May 25	May 26	18.0	90.0	73.0	17.0	15.0	10.0	5.0	11.0	0.80	10.0	20.0	---------	------
July 13	July 25	22.0	40.0	33.0	7.0	6.5	5.5	1.0	8.5	0.80	15.0	17.0	320,000	5.4
July 27	Aug. 8	22.6	57.0	23.0	34.0	6.0	4.0	2.0	4.0	1.80	22.0	14.0	350,000	4.9
Sept. 7	Sept. 19	19.4	33.0	29.0	4.0	9.0	7.0	2.0	12.0	0.40	15.0	19.0	390,000	4.8
Sept. 21	Oct. 3	19.0	30.0	23.0	7.0	6.0	5.5	1.0	10.0	1.40	17.0	19.0	280,000	5.2

TABLE No. 20.

PERIOD COVERED 1907-8		TEMP. DEGREES CENT.	PARTS PER MILLION										BACTERIA per C. C.	Rate of Filtration Million Gallons per Acre per Day
			SUSP'D SOLIDS			NITROGEN AS						Oxygen Consumed		
						ORGANIC			Free Ammonia	Nitrites	Nitrates			
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.						
SETTLED EFFLUENT FROM TWELVE-FOOT SPRINKLING FILTER 2" TO 4" STONE.														
Sept. 20	Sept. 21	20.0	10.0	4.0	6.0	11.0	9.0	2.0	16.0	0.23	1.5	14.0	3,600,000	3.5
Sept. 22	Sept. 23	-----	22.0	21.0	1.0	13.0	13.0	0.0	16.0	1.60	5.0	7.0	---------	3.0
Sept. 24	Sept. 25	19.5	22.0	7.0	15.0	14.0	14.0	0.0	11.0	1.20	8.0	9.0	550,000	3.8
Sept. 28	Sept. 29	-----	9.0	8.0	1.0	12.0	11.0	1.0	13.0	1.60	6.0	8.0	300,000	3.9
Sept. 30	Oct. 1	19.0	26.0	16.0	10.0	12.0	11.0	1.0	12.0	1.00	4.0	16.0	90,000	3.7
Oct. 2	Oct. 3	16.0	30.0	21.0	9.0	10.0	9.0	1.0	16.0	1.10	6.0	11.0	---------	3.7
Oct. 6	Oct. 7	18.0	36.0	27.0	9.0	8.0	7.0	1.0	18.0	1.30	6.0	17.0	130,000	1.4
Oct. 8	Oct. 9	18.0	42.0	26.0	16.0	8.0	5.0	3.0	16.0	1.20	8.0	13.0	140,000	2.4
Oct. 10	Oct. 11	16.5	24.0	14.0	10.0	4.0	4.0	0.0	18.0	1.60	8.0	11.0	170,000	3.3
Filter rested from October 22 to 29, inclusive.														
Oct. 30	Oct. 31	-----	80.0	50.0	30.0	15.0	-----	-----	20.0	0.50	0.2	21.0	300,000	4.1
Nov. 1	Nov. 2	-----	37.0	19.0	18.0	12.0	-----	-----	18.0	0.60	4.0	16.0	260,000	3.8
Nov. 3	Nov. 4	13.0	22.0	12.0	10.0	11.0	-----	-----	20.0	1.00	5.0	23.0	370,000	------
Filter rested from November 7 to 14, inclusive.														
Nov. 15	Nov. 16	7.0	112.0	52.0	60.0	23.0	-----	-----	25.0	2.86	10.0	27.0	260,000	4.2
Nov. 17	Nov. 18	11.0	54.0	26.0	28.0	9.0	-----	-----	21.0	0.60	1.0	18.0	310,000	3.9
Nov. 29	----- --	11.0	36.0	30.0	6.0	12.0	-----	-----	19.0	0.60	15.0	15.0	---------	3.8
Dec. 11	Dec. 12	9.0	30.0	26.0	4.0	9.0	-----	-----	15.0	0.40	10.0	11.0	200,000	5.2
Dec. 13	Dec. 14	9.0	24.0	18.0	6.0	18.0	-----	-----	14.0	0.40	12.0	13.0	150,000	2.8
Dec. 15	Dec. 16	9.0	24.0	8.0	16.0	8.0	-----	-----	13.0	0.70	10.0	14.0	---------	3.7
Jan. 6	Jan. 8	5.0	24.0	22.0	2.0	7.0	6.0	1.0	13.0	0.30	10.0	18.0	70,000	4.5
Jan. 9	Jan. 11	6.5	16.0	10.0	6.0	8.0	8.0	0.0	8.0	0.40	12.0	11.0	---------	3.8
Jan. 16	Jan. 18	7.0	20.0	18.0	2.0	9.5	9.5	0.0	9.5	0.00	15.0	14.0	---------	3.4
Jan. 19	Jan. 21	8.0	22.0	18.0	4.0	3.0	2.0	1.0	19.0	0.10	15.0	18.0	---------	3.2
Feb. 3	Feb. 5	4.7	28.0	26.0	2.0	10.0	8.0	2.0	14.0	0.20	12.0	23.0	160,000	3.4
Feb. 6	Feb. 8	4.8	36.0	32.0	4.0	9.0	8.0	1.0	13.0	0.10	8.0	18.0	---------	3.4
Feb. 12	Feb. 14	7.3	25.0	16.0	9.0	7.0	5.0	2.0	11.0	0.30	10.0	15.0	310,000	4.4
Feb. 15	Feb. 17	7.5	28.0	19.0	9.0	9.0	7.0	2.0	13.0	0.40	10.0	21.0	160,000	4.1
Feb. 21	Feb. 23	6.0	19.0	15.0	4.0	6.0	4.0	2.0	13.0	0.10	12.0	17.0	---------	2.9
Feb. 24	Feb. 26	6.7	21.5	15.5	6.0	7.5	7.5	0.0	7.5	0.10	10.0	15.0	100,000	3.8
Feb. 29	Mar. 2	7.5	14.5	11.0	3.5	7.0	6.0	1.0	13.0	0.20	12.0	15.0	---------	3.3
Mar. 3	Mar. 5	7.5	16.5	13.0	3.5	8.0	8.0	0.0	11.0	0.20	12.0	16.0	120,000	3.1
Mar. 10	Mar. 12	7.3	21.0	18.5	2.5	8.5	7.5	1.0	9.5	0.30	12.0	17.0	---------	3.3
Mar. 13	Mar. 15	9.0	18.5	16.5	2.0	7.0	6.0	1.0	12.0	0.20	20.0	14.0	---------	3.2
Mar. 18	Mar. 23	8.8	18.0	14.0	4.0	11.0	7.0	4.0	36.0	0.25	15.0	15.0	160,000	3.1
Mar. 28	April 10	11.1	28.0	28.0	0.0	19.0	17.0	2.0	11.0	0.30	10.0	18.0	160,000	3.6
May 25	May 26	18.0	63.0	54.0	9.0	12.0	10.0	2.0	11.0	0.60	8.0	52.0	---------	------
July 13	July 25	22.0	31.0	23.0	8.0	5.5	4.5	1.0	8.5	2.00	10.0	8.0	280,000	5.4
July 27	Aug. 8	22.6	20.0	11.0	9.0	4.0	4.0	0.0	4.0	1.60	20.0	11.0	210,000	4.9
Sept. 7	Sept. 19	19.4	15.0	14.0	1.0	7.0	6.0	1.0	12.0	0.30	12.0	13.0	220,000	4.8
Sept. 21	Oct. 3	19.0	32.0	26.0	6.0	5.0	3.0	2.0	11.0	1.00	17.0	15.0	290,000	5.2

TABLE No. 21.

Period Covered 1907-8		Temp. Degrees Cent.	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			Susp'd Solids			Nitrogen as						Oxygen Consumed		
						Organic			Free Ammonia	Nitrites	Nitrates			
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.						
Effluent From Six-foot Sprinkling Filter 4″ to 6″ Stone.														
Sept. 20	Sept. 21	20.0	22.0	19.0	3.0	11.0	10.0	1.0	18.0	0.07	0.0	21.0	3,200,000	3.5
Sept. 22	Sept. 23	-----	55.0	39.0	16.0	16.0	14.0	2.0	17.0	0.40	0.0	16.0	---------	3.0
Sept. 24	Sept. 25	19.0	41.0	25.0	16.0	17.0	16.0	1.0	12.0	0.70	5.0	16.0	1,600,000	3.8
Sept. 28	Sept. 29	-----	23.0	20.0	3.0	15.0	8.0	7.0	16.0	1.10	2.0	14.0	780,000	3.9
Sept. 30	Oct. 1	19.0	34.0	23.0	11.0	13.0	11.0	2.0	17.0	0.30	0.0	30.0	130,000	3.7
Oct. 2	Oct. 3	17.0	58.0	38.0	20.0	13.0	10.0	3.0	20.0	0.00	0.0	25.0	---------	3.7
Oct. 6	Oct. 7	18.0	152.0	83.0	69.0	13.0	10.0	3.0	25.0	0.00	0.0	33.0	120,000	1.4
Oct. 8	Oct. 9	16.0	172.0	112.0	60.0	15.0	7.0	8.0	21.0	0.10	0.0	37.0	350,000	2.4
Oct. 10	Oct. 11	16.5	89.0	58.0	31.0	8.0	4.0	4.0	25.0	0.30	0.0	26.0	470,000	3.3
Filter rested from October 22 to 29, inclusive.														
Oct. 30	Oct. 31	-----	106.0	68.0	38.0	21.0	----	-----	24.0	0.00	0.0	39.0	570,000	4.1
Nov. 1	Nov. 2	-----	22.0	20.0	2.0	16.0	-----	-----	23.0	0.00	1.0	30.0	680,000	3.8
Nov. 3	Nov. 4	13.0	78.0	56.0	22.0	15.0	-----	-----	23.0	0.40	1.0	35.0	610,000	-------
Filter rested from November 7 to 14, inclusive.														
Nov. 15	Nov. 16	7.0	156.0	132.0	24.0	24.0	-----	-----	26.0	0.20	0.0	33.0	1,100,000	4.2
Nov. 17	Nov. 18	11.0	62.0	56.0	6.0	13.0	-----	-----	23.0	1.10	0.0	25.0	1,300,000	3.9
Nov. 29	--------	11.0	58.0	44.0	14.0	16.0	-----	-----	22.0	0.20	2.0	34.0	---------	3.8
Dec. 11	Dec. 12	8.1	66.0	58.0	8.0	14.0	-----	-----	19.0	0.10	0.0	25.0	530,000	5.2
Dec. 13	Dec. 14	8.0	34.0	30.0	4.0	18.0	-----	-----	17.0	0.20	2.0	22.0	790,000	2.8
Dec. 15	Dec. 16	8.0	58.0	42.0	16.0	7.0	-----	-----	18.0	0.30	6.0	24.0	---------	3.7
Jan. 6	Jan. 8	6.0	96.0	75.0	21.0	12.0	6.0	6.0	21.0	0.30	1.0	65.0	360,000	4.5
Jan. 9	Jan. 11	5.5	49.0	47.0	2.0	4.0	3.0	1.0	18.0	0.20	3.0	22.0	---------	3.7
Jan. 16	Jan. 18	7.0	34.0	28.0	6.0	9.0	8.0	1.0	17.0	0.00	2.0	28.0	---------	3.4
Jan. 19	Jan. 21	8.5	63.5	54.0	9.5	14.0	9.0	5.0	22.0	0.00	1.0	40.0	---------	3.2
Feb. 3	Feb. 5	4.8	64.0	58.0	6.0	12.0	8.0	4.0	20.0	0.10	1.0	43.0	730,000	3.4
Feb. 6	Feb. 8	5.3	72.0	66.0	6.0	14.0	10.0	4.0	18.0	0.05	1.0	42.0	---------	3.4
Feb. 12	Feb. 14	7.5	106.0	78.0	28.0	14.0	10.0	4.0	15.0	0.25	1.0	34.0	760,000	4.4
Feb. 15	Feb. 17	7.3	108.0	84.0	24.0	13.0	10.0	3.0	18.0	0.20	1.0	44.0	1,000,000	4.1
Feb. 21	Feb. 22	6.0	90.0	76.0	14.0	10.0	8.0	2.0	18.0	0.10	3.0	41.0	---------	2.9
Feb. 24	Feb. 26	6.5	124.0	99.0	25.0	11.0	8.0	3.0	15.0	0.10	1.0	42.0	770,000	3.8
Feb. 29	Mar. 2	8.0	99.0	82.0	17.0	12.0	10.0	2.0	19.0	0.20	0.0	44.0	---------	3.3
Mar. 3	Mar. 5	7.2	90.0	80.0	10.0	11.0	8.0	3.0	18.0	0.10	1.0	37.0	560,000	3.1

TABLE No. 22.

Period Covered 1907-8		Temp. Degrees Cent.	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			Susp'd Solids			Nitrogen as						Oxygen Consumed		
						Organic			Free Ammonia	Nitrites	Nitrates			
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.						
Settled Effluent From Six-foot Sprinkling Filter 4″ to 6″ Stone.														
Sept. 20	Sept. 21	20.0	10.0	10.0	0.0	11.0	10.0	1.0	17.0	0.08	0.0	20.0	3,600,000	3.5
Sept. 22	Sept. 23	-----	39.0	35.0	4.0	16.0	15.0	1.0	17.0	1.20	0.0	14.0	----------	3.0
Sept. 24	Sept. 25	19.0	38.0	26.0	12.0	17.0	15.0	2.0	12.0	0.70	5.0	16.0	1,300,000	3.8
Sept. 28	Sept. 29	-----	34.0	32.0	2.0	14.0	9.0	5.0	16.0	1.20	3.0	14.0	1,000,000	3.9
Sept. 30	Oct. 1	19.0	31.0	30.0	1.0	14.0	12.0	2.0	16.0	0.30	0.0	28.0	170,000	3.7
Oct. 2	Oct. 3	17.0	39.0	32.0	7.0	21.0	20.0	1.0	20.0	0.00	0.0	20.0	----------	3.7
Oct. 6	Oct. 7	18.0	64.0	42.0	22.0	12.0	10.0	2.0	24.0	0.10	0.0	29.0	170,000	1.4
Oct. 8	Oct. 9	16.0	73.0	51.0	22.0	11.0	7.0	4.0	21.0	0.10	0.0	31.0	480,000	2.4
Oct. 10	Oct. 11	16.5	48.0	33.0	15.0	8.0	6.0	2.0	24.0	0.30	1.0	23.0	450,000	3.3
Filter rested from October 22 to 29, inclusive.														
Oct. 30	Oct. 31	-----	92.0	54.0	38.0	11.0	-----	-----	24.0	0.10	0.0	33.0	590,000	4.1
Nov. 1	Nov. 2	-----	42.0	30.0	12.0	15.0	-----	-----	23.0	0.00	1.0	32.0	1,000,000	3.8
Nov. 3	Nov. 4	13.0	50.0	38.0	12.0	15.0	-----	-----	22.0	1.00	3.0	36.0	830,000	-------
Filter rested from November 7 to 14, inclusive.														
Nov. 15	Nov. 16	7.0	64.0	52.0	12.0	23.0	-----	-----	26.0	0.40	1.0	34.0	1,300,000	4.2
Nov. 17	Nov. 18	11.0	56.0	44.0	12.0	13.0	-----	-----	23.0	0.70	0.0	29.0	1,500,000	3.9
Nov. 29	---------	11.0	40.0	34.0	6.0	17.0	-----	-----	22.0	0.10	2.0	34.0	----------	3.8
Dec. 11	Dec. 12	8.1	50.0	38.0	12.0	15.0	-----	-----	19.0	0.10	0.0	26.0	560,000	5.2
Dec. 13	Dec. 14	8.0	26.0	18.0	8.0	20.0	-----	-----	17.0	0.30	2.0	22.0	710,000	2.8
Dec. 15	Dec. 16	8.0	30.0	20.0	10.0	8.0	-----	-----	18.0	0.30	3.0	29.0	----------	3.7
Jan. 6	Jan. 8	6.0	45.0	42.0	3.0	11.0	8.0	3.0	20.0	0.30	1.0	32.0	1,000,000	4.5
Jan. 9	Jan. 11	5.5	26.5	20.5	6.0	6.0	5.0	1.0	16.0	0.30	3.0	21.0	----------	3.7
Jan. 16	Jan. 18	7.0	24.0	20.0	4.0	10.0	8.0	2.0	17.0	0.05	2.0	26.0	----------	3.4
Jan. 19	Jan. 21	8.5	42.0	35.0	7.0	16.0	10.0	6.0	21.0	0.00	1.0	35.0	----------	3.2
Feb. 3	Feb. 5	4.8	30.0	28.0	2.0	13.0	12.0	1.0	19.0	0.10	1.0	41.0	930,000	3.4
Feb. 6	Feb. 8	5.3	39.0	35.0	4.0	13.0	10.0	3.0	18.0	0.05	1.0	35.0	----------	3.4
Feb. 12	Feb. 14	7.5	58.0	48.0	10.0	13.0	11.0	2.0	14.0	0.20	1.0	26.0	----------	4.4
Feb. 15	Feb. 17	7.3	62.0	46.0	16.0	14.0	11.0	3.0	17.0	0.20	1.0	37.0	260,000	4.1
Feb. 21	Feb. 23	6.0	50.0	40.0	10.0	10.0	8.0	2.0	18.0	0.10	3.0	31.0	----------	2.9
Feb. 24	Feb. 26	6.5	43.5	30.5	13.0	11.0	7.0	4.0	15.0	0.10	1.0	31.0	500,000	3.8
Feb. 29	Mar. 2	8.0	22.5	19.0	3.5	12.0	10.0	2.0	18.0	0.20	0.0	38.0	----------	3.3
Mar. 3	Mar. 5	7.2	29.0	24.5	4.5	11.0	8.0	3.0	18.0	0.10	1.0	33.0	380,000	3.1

TABLE No. 23.

Period Covered 1907-8		Temp. Degrees Cent.	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			Susp'd Solids			Nitrogen as						Oxygen Consumed		
						Organic								
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates			
Effluent From Nine-foot Sprinkling Filter 4″ to 6″ Stone.														
Sept. 20	Sept. 21	20.0	57.0	44.0	13.0	12.0	8.0	4.0	18.0	0.09	0.2	20.0	3,600,000	3.5
Sept. 22	Sept. 23	-----	44.0	36.0	8.0	16.0	15.0	1.0	17.0	0.80	4.0	10.0	---------	3.0
Sept. 24	Sept. 25	19.0	35.0	24.0	11.0	18.0	14.0	4.0	12.0	0.70	5.0	14.0	1,300,000	3.8
Sept. 28	Sept. 29	-----	29.0	25.0	4.0	10.0	10.0	0.0	15.0	1.10	5.0	9.0	920,000	3.9
Sept. 30	Oct. 1	19.0	65.0	42.0	23.0	18.0	15.0	3.0	14.0	0.50	1.0	23.0	490,000	3.7
Oct. 2	Oct. 3	16.0	54.0	38.0	16.0	12.0	9.0	3.0	20.0	0.30	0.0	14.0	---------	3.7
Oct. 6	Oct. 7	17.0	125.0	78.0	47.0	12.0	8.0	4.0	24.0	0.00	0.0	27.0	220,000	1.4
Oct. 8	Oct. 9	17.0	162.0	102.0	60.0	12.0	7.0	5.0	21.0	0.20	0.0	24.0	340,000	2.4
Oct. 10	Oct. 11	15.0	86.0	52.0	34.0	7.0	6.0	1.0	24.0	0.40	2.0	21.0	470,000	3.3
Filter rested from October 22 to 29, inclusive.														
Oct. 30	Oct. 31	-----	112.0	72.0	40.0	20.0	-----	-----	23.0	0.00	0.0	28.0	540,000	4.1
Nov. 1	Nov. 2	-----	54.0	28.0	26.0	13.0	-----	-----	22.0	0.20	2.0	23.0	350,000	3.8
Nov. 3	Nov. 4	13.0	56.0	38.0	18.0	14.0	-----	-----	22.0	1.80	5.0	28.0	750,000	------
Filter rested from November 7 to 14, inclusive.														
Nov. 15	Nov. 16	5.0	124.0	104.0	20.0	26.0	-----	-----	26.0	0.40	0.0	30.0	850,000	4.2
Nov. 17	Nov. 18	10.0	54.0	42.0	12.0	12.0	-----	-----	22.0	0.60	0.0	25.0	1,100,000	3.9
Nov. 29	----- --	11.0	60.0	46.0	14.0	15.0	-----	-----	22.0	0.40	4.0	26.0	---------	3.8
Dec. 11	Dec. 12	8.5	52.0	40.0	12.0	13.0	-----	-----	19.0	1.00	3.0	16.0	440,000	5.2
Dec. 13	Dec. 14	9.0	30.0	22.0	8.0	14.0	-----	-----	18.0	0.30	2.0	15.0	550,000	2.8
Dec. 15	Dec. 16	9.0	38.0	22.0	16.0	7.0	-----	-----	18.0	0.80	3.0	16.0	---------	3.7
Jan. 6	Jan. 8	4.7	55.0	46.0	9.0	11.0	8.0	3.0	19.0	0.30	3.0	28.0	270,000	4.5
Jan. 9	Jan. 11	5.5	28.0	19.0	9.0	5.0	4.0	1.0	16.0	0.40	5.0	18.0	---------	3.8
Jan. 16	Jan. 18	6.0	49.0	41.0	8.0	15.0	11.0	4.0	16.0	0.05	5.0	21.0	---------	3.4
Jan. 19	Jan. 21	7.5	63.0	50.0	13.0	12.0	10.0	2.0	21.0	0.00	1.0	28.0	---------	3.2
Feb. 3	Feb. 5	4.3	46.0	42.0	4.0	11.0	10.0	1.0	18.0	0.10	2.0	37.0	520,000	3.4
Feb. 6	Feb. 8	4.5	48.0	43.0	5.0	9.0	7.0	2.0	19.0	0.05	1.0	28.0	---------	3.4
Feb. 12	Feb. 14	7.0	51.0	36.0	15.0	10.0	8.0	2.0	14.0	0.25	1.0	25.0	730,000	4.4
Feb. 15	Feb. 17	7.3	48.0	40.0	8.0	11.0	8.0	3.0	17.0	0.20	1.0	28.0	580,000	4.1
Feb. 21	Feb. 23	6.0	40.0	30.0	10.0	7.0	6.0	1.0	18.0	0.15	5.0	28.0	---------	2.9
Feb. 24	Feb. 26	6.3	43.0	34.0	9.0	10.0	8.0	2.0	15.0	0.60	1.0	26.0	80,000	3.8
Feb. 29	Mar. 2	7.5	37.0	32.0	5.0	9.0	8.0	2.0	18.0	0.40	2.0	25.0	---------	3.3
Mar. 3	Mar. 5	6.8	39.0	31.0	8.0	9.0	7.0	2.0	17.0	0.20	1.0	28.0	190,000	3.1

TABLE No. 24.

Period Covered 1907-8		Temp. Degrees Cent.	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			Susp'd Solids			Nitrogen as						Oxygen Consumed		
						Organic								
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates			
Settled Effluent From Nine-foot Sprinkling Filter 4″ to 6″ Stone														
Sept. 20	Sept. 21	20.0	16.0	11.0	5.0	11.0	10.0	1.0	18.0	0.10	0.0	19.0	3,000,000	3.5
Sept. 22	Sept. 23	-----	32.0	28.0	4.0	17.0	14.0	3.0	17.0	0.80	4.0	11.0	---------	3.0
Sept. 24	Sept. 25	19.0	31.0	16.0	15.0	17.0	14.0	3.0	12.0	0.70	5.0	15.0	1,000,000	3.8
Sept. 28	Sept. 29	-----	6.0	2.0	4.0	16.0	8.0	8.0	15.0	0.90	5.0	13.0	540,000	3.9
Sept. 30	Oct. 1	19.0	14.0	11.0	3.0	12.0	10.0	2.0	16.0	0.40	0.0	18.0	140,000	3.7
Oct. 2	Oct. 3	16.0	29.0	25.0	4.0	12.0	10.0	2.0	19.0	0.20	0.0	18.0	---------	3.7
Oct. 6	Oct. 7	17.0	51.0	40.0	11.0	9.0	9.0	0.0	23.0	0.20	0.0	20.0	260,000	1.4
Oct. 8	Oct. 9	17.0	65.0	47.0	18.0	11.0	11.0	0.0	20.0	0.40	0.0	22.0	440,000	2.4
Oct. 10	Oct. 11	15.0	49.0	37.0	12.0	7.0	6.0	1.0	24.0	0.60	2.0	19.0	470,000	3.3
Filter rested from October 22 to 29, inclusive.														
Oct. 30	Oct. 31	-----	86.0	48.0	38.0	20.0	-----	-----	24.0	0.10	0.0	29.0	640,000	4.1
Nov. 1	Nov. 2	-----	36.0	23.0	13.0	14.0	-----	-----	23.0	0.20	2.0	24.0	320,000	3.8
Nov. 3	Nov. 4	13.0	30.0	24.0	6.0	11.0	-----	-----	23.0	1.60	5.0	23.0	610,000	-------
Filter rested from November 7 to 14, inclusive.														
Nov. 15	Nov. 16	5.0	92.0	72.0	20.0	22.0	-----	-----	26.0	0.20	0.0	32.0	950,000	4.2
Nov. 17	Nov. 18	10.0	64.0	48.0	16.0	13.0	-----	-----	23.0	0.50	0.0	22.0	790,000	3.9
Nov. 29	----- --	11.0	34.0	26.0	8.0	14.0	-----	-----	22.0	0.40	4.0	24.0	---------	3.8
Dec. 11	Dec. 12	8.5	44.0	36.0	8.0	11.0	-----	-----	19.0	0.80	1.0	19.0	320,000	5.2
Dec. 13	Dec. 14	9.0	32.0	24.0	8.0	16.0	-----	-----	17.0	0.30	5.0	18.0	390,000	2.8
Dec. 15	Dec. 16	9.0	32.0	12.0	20.0	6.0	-----	-----	18.0	0.60	7.0	20.0	---------	3.7
Jan. 6	Jan. 8	4.7	26.0	24.0	2.0	10.0	7.0	3.0	19.0	0.30	3.0	25.0	250,000	4.5
Jan. 9	Jan. 11	5.5	20.0	15.0	5.0	5.0	4.0	1.0	17.0	0.50	5.0	16.0	---------	3.7
Jan. 16	Jan. 18	6.0	26.0	18.0	8.0	15.0	10.0	5.0	15.0	0.10	5.0	18.0	---------	3.4
Jan. 19	Jan. 21	7.5	47.0	41.5	5.5	12.0	9.0	3.0	21.0	0.10	1.0	27.0	---------	3.2
Feb. 3	Feb. 5	4.3	30.0	29.0	1.0	14.0	11.0	3.0	18.0	0.10	2.0	38.0	620,000	3.4
Feb. 6	Feb. 8	4.5	36.0	34.0	2.0	9.0	8.0	1.0	19.0	0.05	1.0	30.0	---------	3.4
Feb. 12	Feb. 14	7.0	29.0	21.0	8.0	10.0	8.0	2.0	14.0	0.20	1.0	22.0	430,000	4.4
Feb. 15	Feb. 17	7.3	29.0	22.0	7.0	9.0	8.0	1.0	17.0	0.40	2.0	28.0	640,000	4.1
Feb. 21	Feb. 23	6.0	26.0	21.0	5.0	8.0	7.0	1.0	18.0	0.15	5.0	24.0	---------	2.9
Feb. 24	Feb. 26	6.3	23.5	20.0	3.5	8.0	7.0	1.0	15.0	0.60	1.0	24.0	500,000	3.8
Feb. 29	Mar. 2	7.5	21.0	17.5	3.5	9.0	8.0	1.0	18.0	0.30	2.0	31.0	---------	3.3
Mar. 3	Mar. 5	6.8	28.5	22.5	6.0	10.0	8.0	2.0	17.0	0.10	1.0	25.0	330,000	3.1

TABLE No. 25.

Period Covered 1907-8		Temp. Degrees Cent.	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			Susp'd Solids			Nitrogen as						Oxygen Consumed		
						Organic								
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates			
Effluent From Twelve-foot Sprinkling Filter 4″ to 6″ Stone.														
Sept. 20	Sept. 21	20.0	29.0	28.0	1.0	14.0	11.0	3.0	16.0	0.22	0.0	15.0	3,500,000	3.5
Sept. 22	Sept. 23	-----	34.0	30.0	4.0	14.0	13.0	1.0	16.0	0.80	5.0	9.0	---------	3.0
Sept. 24	Sept. 25	19.0	17.0	13.0	4.0	18.0	16.0	2.0	11.0	0.80	5.0	13.0	850,000	3.8
Sept. 28	Sept. 29	-----	32.0	19.0	13.0	11.0	9.0	2.0	15.0	1.20	5.0	9.0	450,000	3.9
Sept. 30	Oct. 1	19.0	54.0	32.0	22.0	12.0	10.0	2.0	14.0	0.60	2.0	18.0	190,000	3.7
Oct. 2	Oct. 3	15.0	56.0	35.0	21.0	12.0	9.0	3.0	19.0	0.80	2.0	15.0	---------	3.7
Oct. 6	Oct. 7	17.0	138.0	87.0	51.0	13.0	8.0	5.0	22.0	0.40	0.0	28.0	270,000	1.4
Oct. 8	Oct. 9	18.0	140.0	84.0	56.0	12.0	6.0	6.0	20.0	0.70	1.0	24.0	280,000	2.4
Oct. 10	Oct. 11	16.0	96.0	61.0	35.0	8.0	7.0	1.0	21.0	0.70	2.0	17.0	390,000	3.3
Filter rested from October 22 to 29, inclusive.														
Oct. 30	Oct. 31	-----	108.0	66.0	42.0	18.0	-----	-----	24.0	0.10	0.0	28.0	500,000	4.1
Nov. 1	Nov. 2	-----	66.0	28.0	38.0	15.0	-----	-----	21.0	0.70	3.0	22.0	490,000	3.8
Nov. 3	Nov. 4	13.0	42.0	24.0	18.0	13.0	-----	-----	21.0	1.00	5.0	26.0	440,000	------
Filter rested from November 7 to 14, inclusive.														
Nov. 15	Nov. 16	5.0	100.0	64.0	36.0	23.0	-----	-----	24.0	1.60	1.0	28.0	540,000	4.2
Nov. 17	Nov. 18	10.0	72.0	50.0	22.0	10.0	-----	-----	22.0	1.00	0.0	20.0	1,000,000	3.9
Nov. 29	--------	11.0	70.0	44.0	26.0	13.0	-----	-----	22.0	0.40	5.0	24.0	---------	3.8
Dec. 11	Dec. 12	7.8	62.0	44.0	18.0	12.0	-----	-----	18.0	1.40	4.0	17.0	330,000	5.2
Dec. 13	Dec. 14	8.0	38.0	28.0	10.0	18.0	-----	-----	17.0	0.40	5.0	14.0	590,000	2.8
Dec. 15	Dec. 16	8.0	90.0	44.0	46.0	8.0	-----	-----	17.0	0.60	5.0	22.0	---------	3.7
Jan. 6	Jan. 8	4.3	45.0	35.0	10.0	10.0	7.0	3.0	16.0	0.40	4.0	23.0	330,000	4.5
Jan. 9	Jan. 11	5.5	23.5	14.5	9.0	7.0	5.0	2.0	14.0	0.40	7.0	15.0	---------	3.7
Jan. 16	Jan. 18	6.0	30.0	27.0	3.0	12.0	8.0	4.0	14.0	0.00	5.0	18.0	---------	3.4
Jan. 19	Jan. 21	7.5	43.0	34.0	9.0	12.0	10.0	2.0	19.0	0.10	5.0	23.0	---------	3.2
Feb. 3	Feb. 5	4.3	46.0	44.0	2.0	10.0	9.0	1.0	18.0	0.20	4.0	31.0	980,000	3.4
Feb. 6	Feb. 8	4.5	38.0	32.0	6.0	13.0	12.0	1.0	13.0	0.10	1.0	24.0	---------	3.4
Feb. 12	Feb. 14	7.0	48.0	36.0	12.0	9.0	8.0	1.0	13.0	0.20	4.0	18.0	700,000	4.4
Feb. 15	Feb. 17	4.5	56.0	40.0	16.0	10.0	8.0	2.0	16.0	0.20	5.0	25.0	530,000	4.1
Feb. 21	Feb. 23	6.0	34.0	28.0	6.0	8.0	6.0	2.0	16.0	0.05	7.0	27.0	---------	2.9
Feb. 24	Feb. 26	6.5	42.0	34.0	8.0	10.0	9.0	1.0	13.0	0.20	3.0	23.0	140,000	3.8
Feb. 29	Mar. 2	7.0	39.0	33.0	6.0	11.0	10.0	1.0	16.0	0.20	3.0	25.0	---------	3.3
Mar. 3	Mar. 5	6.5	58.0	44.0	14.0	12.0	9.0	3.0	15.0	0.20	2.0	25.0	350,000	3.1
May 25	May 26	18.0	91.0	71.0	20.0	14.0	9.0	5.0	13.0	0.50	1.0	66.0	---------	------
July 13	July 25	21.7	86.0	65.0	21.0	9.0	6.0	3.0	13.0	1.00	3.0	21.0	340,000	5.4
July 27	Aug. 8	22.5	48.0	33.0	15.0	7.0	4.0	3.0	10.0	2.00	7.0	12.0	550,000	4.9
Sept. 7	Sept. 19	18.9	33.0	28.0	5.0	9.0	7.0	2.0	15.0	0.10	5.0	17.0	540,000	4.8
Sept. 21	Oct. 3	18.7	32.0	26.0	6.0	6.0	5.0	1.0	14.0	0.50	4.0	17.0	370,000	5.2

TABLE No. 26.

PERIOD COVERED 1907-8		TEMP. DEGREES CENT.	PARTS PER MILLION										BACTERIA PER C. C.	RATE OF FILTRATION MILLION GALLONS PER ACRE PER DAY
			SUSP'D SOLIDS			NITROGEN AS						OXYGEN CONSUMED		
						ORGANIC								
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates			
SETTLED EFFLUENT FROM TWELVE-FOOT SPRINKLING FILTER 4″ TO 6″ STONE.														
Sept. 20	Sept. 21	20.0	10.0	5.0	5.0	14.0	12.0	2.0	16.0	0.18	0.3	19.0	4,100,000	3.5
Sept. 22	Sept. 23	-----	23.0	23.0	0.0	14.0	13.0	1.0	17.0	0.50	5.0	8.0	---------	3.0
Sept. 24	Sept. 25	19.0	26.0	11.0	15.0	14.0	14.0	0.0	11.0	0.70	5.0	14.0	1,200,000	3.8
Sept. 28	Sept. 29	-----	7.0	7.0	0.0	12.0	10.0	2.0	15.0	1.20	4.0	10.0	490,000	3.9
Sept. 30	Oct. 1	19.0	28.0	20.0	8.0	13.0	11.0	2.0	13.0	0.70	2.0	18.0	100,000	3.7
Oct. 2	Oct. 3	15.0	31.0	23.0	8.0	11.0	10.0	1.0	19.0	0.50	2.0	13.0	---------	3.7
Oct. 6	Oct. 7	17.0	41.0	34.0	7.0	9.0	8.0	1.0	22.0	0.50	3.0	23.0	320,000	1.4
Oct. 8	Oct. 9	18.0	61.0	39.0	22.0	9.0	6.0	3.0	20.0	0.80	1.0	21.0	360,000	2.4
Oct. 10	Oct. 11	16.0	46.0	27.0	19.0	8.0	7.0	1.0	22.0	0.60	3.0	19.0	460,000	3.3
Filter rested from October 22 to 29, inclusive.														
Oct. 30	Oct. 31	-----	88.0	52.0	36.0	18.0	-----	-----	24.0	0.00	0.0	28.0	590,000	4.1
Nov. 1	Nov. 2	-----	40.0	24.0	16.0	13.0	-----	-----	21.0	0.40	3.0	24.0	510,000	3.8
Nov. 3	Nov. 4	13.0	22.0	16.0	6.0	11.0	-----	-----	21.0	1.00	10.0	22.0	580,000	------
Filter rested from November 7 to 14, inclusive.														
Nov. 15	Nov. 16	5.0	108.0	60.0	48.0	21.0	-----	-----	27.0	0.80	5.0	34.0	840,000	4.2
Nov. 17	Nov. 18	10.0	44.0	34.0	10.0	10.0	-----	-----	22.0	0.40	0.0	18.0	770,000	3.9
Nov. 29	--------	11.0	38.0	28.0	10.0	14.0	-----	-----	21.0	0.40	5.0	24.0	---------	3.8
Dec. 11	Dec. 12	7.8	42.0	38.0	4.0	11.0	-----	-----	18.0	0.60	3.0	16.0	280,000	5.2
Dec. 13	Dec. 14	8.0	26.0	20.0	6.0	22.0	-----	-----	17.0	0.20	6.0	16.0	230,000	2.8
Dec. 15	Dec. 16	8.0	32.0	16.0	16.0	6.0	-----	-----	18.0	0.60	8.0	21.0	---------	3.7
Jan. 6	Jan. 8	4.3	30.0	28.0	2.0	6.0	3.0	3.0	18.0	0.30	4.0	21.0	180,000	4.5
Jan. 9	Jan. 11	5.5	23.0	16.5	6.5	3.0	3.0	0.0	16.0	0.40	7.0	18.0	---------	3.8
Jan. 16	Jan. 18	6.0	30.0	20.0	10.0	10.0	6.0	4.0	14.0	0.10	5.0	18.0	---------	3.4
Jan. 19	Jan. 21	7.5	39.5	35.0	4.5	11.0	10.0	1.0	19.0	0.00	5.0	25.0	---------	3.2
Feb. 3	Feb. 5	4.3	26.0	25.0	1.0	10.0	8.0	2.0	18.0	0.20	4.0	31.0	430,000	3.4
Feb. 6	Feb. 8	4.5	24.0	22.0	2.0	11.0	9.0	2.0	17.0	0.05	2.0	26.0	---------	3.4
Feb. 12	Feb. 14	7.0	23.0	17.0	6.0	8.0	6.0	2.0	14.0	0.20	4.0	21.0	300,000	4.4
Feb. 15	Feb. 17	4.5	30.0	22.0	8.0	9.0	8.0	1.0	16.0	0.40	5.0	25.0	420,000	4.1
Feb. 21	Feb. 23	6.0	21.0	18.0	3.0	7.0	5.0	2.0	16.0	0.10	7.0	24.0	---------	2.9
Feb. 24	Feb. 26	6.5	25.0	19.0	6.0	10.0	9.0	1.0	13.0	0.20	3.0	23.0	130,000	3.8
Feb. 29	Mar. 2	7.0	20.0	16.5	3.5	9.0	9.0	0.0	17.0	0.20	3.0	25.0	---------	3.3
Mar. 3	Mar. 5	6.5	22.5	17.5	5.0	8.0	8.0	0.0	16.0	0.10	2.0	23.0	130,000	3.1
May 25	May 26	18.0	46.0	43.0	3.0	15.0	12.0	3.0	12.0	0.40	1.0	60.0	---------	------
July 13	July 25	21.7	56.0	30.0	26.0	6.0	5.0	1.0	13.0	1.20	5.0	17.0	190,000	5.4
July 27	Aug. 8	22.5	27.0	18.0	9.0	5.0	5.0	0.0	10.0	1.40	8.0	14.0	420,000	4.9
Sept. 7	Sept. 19	18.9	29.0	25.0	4.0	9.0	6.0	3.0	16.0	0.10	5.0	18.0	320,000	4.8
Sept. 21	Oct. 3	18.7	23.0	22.0	1.0	6.0	5.0	1.0	14.0	0.50	10.0	17.0	230,000	5.2

TABLES No. 27 TO 30 INCLUSIVE.

PERIOD COVERED 1908		NUMBER OF SAMPLES	PARTS PER MILLION										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			SUSP'D SOLIDS			NITROGEN AS						Oxygen Consumed		
						ORGANIC								
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates			

TABLE No. 27.

EFFLUENT FROM TEN AND ONE-HALF-FOOT SPRINKLING FILTER ½″ TO 1½″ STONE.

From	To	Number of Samples	Susp'd Solids Total	Loss on Ignition	Fixed	Organic Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates	Oxygen Consumed	Bacteria per C. C.	Rate of Filtration
June 8	June 13	1	28.0	14.0	14.0	9.0	8.0	1.0	5.0	0.40	20.0	13.0	110,000	5.0
June 15	June 27	1	37.0	28.0	9.0	5.0	5.0	0.0	3.0	0.40	20.0	13.0	200,000	4.8
June 29	July 11	1	30.0	24.0	6.0	3.5	3.5	0.0	3.5	0.20	15.0	23.0	150,000	5.5
Aug. 10	Aug. 22	1	22.0	17.0	5.0	5.0	4.5	0.5	3.0	0.20	15.0	9.0	190,000	-------
Aug. 24	Sept. 5	1	38.0	27.0	11.0	6.0	4.0	2.0	4.0	0.30	10.0	13.0	300,000	4.9
Oct. 5	Oct. 17	1	8.0	2.0	6.0	5.0	4.0	1.0	13.0	0.60	10.0	12.0	390,000	5.1

TABLE No. 28.

SETTLED EFFLUENT FROM TEN AND ONE-HALF-FOOT SPRINKLING FILTER ½″ TO 1½″ STONE

From	To	Number of Samples	Susp'd Solids Total	Loss on Ignition	Fixed	Organic Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates	Oxygen Consumed	Bacteria per C. C.	Rate of Filtration
June 8	June 13	1	13.0	9.0	4.0	8.0	8.0	0.0	5.0	0.10	20.0	13.0	5,700	5.0
June 15	June 27	1	29.0	23.0	6.0	6.0	5.0	1.0	3.0	0.40	20.0	12.0	1,900	4.8
June 29	July 11	1	38.0	17.0	21.0	4.5	3.5	1.0	3.5	0.20	20.0	20.0	2,500	5.5
Aug. 10	Aug. 22	1	18.0	15.0	3.0	5.0	5.0	0.0	3.0	0.30	15.0	10.0	6,300	-------
Aug. 24	Sept. 5	1	30.0	21.0	9.0	5.0	4.0	1.0	4.0	0.30	10.0	13.0	3,200	4.9
Oct. 5	Oct. 17	1	9.0	2.0	7.0	6.0	4.0	2.0	13.0	0.30	10.0	14.0	110,000	5.1

TABLE No. 29.

EFFLUENT FROM FOUR AND ONE-HALF-FOOT SPRINKLING FILTER 1″ TO 2″ STONE

From	To	Number of Samples	Susp'd Solids Total	Loss on Ignition	Fixed	Organic Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates	Oxygen Consumed	Bacteria per C. C.	Rate of Filtration
June 8	June 13	1	27.0	18.0	9.0	12.0	9.0	3.0	13.0	0.40	4.0	25.0	170,000	5.0
June 15	June 27	1	34.0	30.0	4.0	8.0	8.0	0.0	14.0	0.40	4.0	22.0	270,000	4.8
June 29	July 11	1	63.0	56.0	7.0	10.0	8.0	2.0	13.0	0.30	3.0	32.0	470,000	5.5
Aug. 10	Aug. 22	1	87.0	61.0	26.0	9.0	5.0	4.0	13.0	0.40	5.0	26.0	330,000	-------
Aug. 24	Sept. 5	1	42.0	33.0	9.0	6.0	5.0	1.0	16.0	0.20	3.0	24.0	490,000	4.9
Oct. 5	Oct. 17	1	13.0	10.0	3.0	5.0	4.0	1.0	23.0	0.10	1.0	32.0	1,100,000	5.1

TABLE No. 30.

SETTLED EFFLUENT FROM FOUR AND ONE-HALF-FOOT SPRINKLING FILTER 1″ TO 2″ STONE

From	To	Number of Samples	Susp'd Solids Total	Loss on Ignition	Fixed	Organic Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates	Oxygen Consumed	Bacteria per C. C.	Rate of Filtration
June 8	June 13	1	17.0	10.0	7.0	9.0	8.0	1.0	14.0	0.40	4.0	14.0	110,000	5.0
June 15	June 27	1	26.0	20.0	6.0	9.0	9.0	0.0	13.0	0.40	4.5	16.0	170,000	4.8
June 29	July 11	1	16.0	16.0	0.0	8.0	7.0	1.0	13.0	0.30	4.0	19.0	390,000	5.5
Aug. 10	Aug. 22	1	16.0	15.0	1.0	6.0	5.0	1.0	13.0	0.40	5.0	14.0	200,000	-------
Aug. 24	Sept. 5	1	34.0	26.0	8.0	6.0	5.0	1.0	16.0	0.30	3.0	16.0	360,000	4.9
Oct. 5	Oct. 17	1	11.0	10.0	1.0	5.0	5.0	0.0	22.0	0.10	1.0	28.0	990,000	5.1

TABLES No. 31 TO 34 INCLUSIVE.

TABLE No. 31.

EFFLUENT FROM SEVEN AND ONE-HALF-FOOT SPRINKLING FILTER 1" TO 2" STONE.

Period Covered 1908		Number of Samples	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			Susp'd Solids			Nitrogen as						Oxygen Consumed		
						Organic			Free Ammonia	Nitrites	Nitrates			
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.						
June 8	June 13	1	26.0	15.0	11.0	9.0	8.0	1.0	10.0	0.70	15.0	15.0	80,000	5.0
June 15	June 27	1	46.0	38.0	8.0	8.0	8.0	0.0	9.0	0.80	10.0	14.0	100,000	4.8
June 29	July 11	1	38.0	33.0	5.0	9.0	8.0	1.0	10.0	0.40	10.0	19.0	260,000	5.5
Aug. 10	Aug. 22	1	42.0	32.0	10.0	8.5	6.5	2.0	7.5	0.60	20.0	16.0	280,000	------
Aug. 24	Sept. 5	1	47.0	34.0	13.0	9.0	7.0	2.0	9.0	0.60	7.0	16.0	300,000	4.9
Oct. 5	Oct. 17	1	9.0	5.0	4.0	4.0	3.0	1.0	18.0	0.30	4.0	15.0	620,000	5.1

TABLE No. 32.

SETTLED EFFLUENT FROM SEVEN AND ONE-HALF-FOOT SPRINKLING FILTER 1" TO 2" STONE.

Period Covered 1908		Number of Samples	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			Susp'd Solids			Nitrogen as						Oxygen Consumed		
						Organic			Free Ammonia	Nitrites	Nitrates			
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.						
June 8	June 13	1	20.0	11.0	9.0	8.0	7.0	1.0	10.0	0.70	15.0	15.0	100,000	5.0
June 15	June 27	1	29.0	26.0	3.0	7.5	7.5	0.0	8.5	1.00	10.0	15.0	120,000	4.8
June 29	July 11	1	32.0	24.0	8.0	7.0	5.0	2.0	9.0	0.30	7.0	19.0	160,000	5.5
Aug. 10	Aug. 22	1	33.0	22.0	11.0	7.0	6.0	1.0	7.0	0.60	10.0	15.0	200,000	-------
Aug. [illegible]	Sept. 5	1	29.0	21.0	8.0	8.5	5.5	3.0	8.5	0.50	5.0	16.0	230,000	4.9
Oct. 5	Oct. 17	1	6.0	4.0	2.0	6.0	5.0	1.0	19.0	0.20	4.0	28.0	610,000	5.1

TABLE No. 33.

EFFLUENT FROM TEN AND ONE-HALF-FOOT SPRINKLING FILTER 1" TO 2" STONE.

Period Covered 1908		Number of Samples	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			Susp'd Solids			Nitrogen as						Oxygen Consumed		
						Organic			Free Ammonia	Nitrites	Nitrates			
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.						
June 8	June 13	1	21.0	11.0	10.0	9.0	8.0	1.0	8.0	0.70	20.0	14.0	100,000	5.0
June 15	June 27	1	34.0	30.0	4.0	6.0	5.0	1.0	4.0	0.60	20.0	14.0	100,000	4.8
June 29	July 11	1	19.0	18.0	1.0	6.0	4.0	2.0	4.0	0.40	20.0	19.0	170,000	5.5
Aug. 10	Aug. 22	1	42.0	26.0	16.0	5.0	4.0	1.0	4.0	0.40	20.0	15.0	250,000	-------
Aug. 24	Sept. 5	1	59.0	43.0	16.0	13.0	8.5	4.5	4.5	0.40	15.0	17.0	440,000	4.9
Oct. 5	Oct. 17	1	13.0	7.0	6.0	4.0	2.0	2.0	17.0	1.00	7.0	20.0	440,000	5.1

TABLE No. 34

SETTLED EFFLUENT FROM TEN AND ONE-HALF-FOOT SPRINKLING FILTER 1" TO 2" STONE.

Period Covered 1908		Number of Samples	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			Susp'd Solids			Nitrogen as						Oxygen Consumed		
						Organic			Free Ammonia	Nitrites	Nitrates			
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.						
June 8	June 13	1	16.0	7.0	9.0	7.0	7.0	0.0	8.0	0.60	20.0	11.0	180,000	5.0
June 15	June 27	1	28.0	26.0	2.0	5.0	5.0	0.0	4.0	0.60	20.0	13.0	150,000	4.8
June 29	July 11	1	34.0	21.0	13.0	5.0	3.0	2.0	4.0	0.40	20.0	11.0	190,000	5.5
Aug. 10	Aug. 22	1	38.0	22.0	16.0	5.0	4.0	1.0	4.0	0.40	20.0	12.0	220,000	-------
Aug. 24	Sept. 5	1	26.0	18.0	8.0	9.5	5.5	4.0	4.5	0.40	12.0	12.0	290,000	4.9
Oct. 5	Oct. 17	1	11.0	3.0	8.0	3.0	3.0	0.0	17.0	0.80	7.0	14.0	360,000	5.1

TABLES No. 35 TO 38 INCLUSIVE.

Period Covered 1908		Number of Samples	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			Susp'd Solids			Nitrogen as						Oxygen Consumed		
						Organic			Free Ammonia	Nitrites	Nitrates			
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.						
TABLE No. 35.														
Effluent From Four and One-half-foot Sprinkling Filter 1″ to 3″ Stone.														
June 8	June 13	1	31.0	18.0	13.0	12.0	10.0	2.0	15.0	0.00	0.5	30.0	610,000	5.0
June 15	June 27	1	48.0	41.0	7.0	11.0	9.0	2.0	14.0	0.50	1.0	22.0	320,000	4.8
June 29	July 11	1	30.0	27.0	3.0	10.0	8.0	2.0	13.0	0.40	2.0	29.0	540,000	5.5
Aug. 10	Aug. 22	1	39.0	30.0	9.0	6.0	5.0	1.0	14.0	0.70	5.0	20.0	690,000	-------
Aug. 24	Sept. 5	1	38.0	26.0	12,0	7.0	5.0	2.0	15.0	0.20	3.0	19.0	550,000	4.9
Oct. 5	Oct. 17	1	19.0	13.0	6.0	4.0	3.0	1.0	22.0	0.00	1.0	31.0	1,130,000	5.1
TABLE No. 36.														
Settled Effluent From Four and One-half-foot Sprinkling Filter 1″ to 3″ Stone.														
June 8	June 13	1	19.0	15.0	4.0	12.0	10.0	2.0	15.0	0.00	0.0	28.0	54,000	5.0
June 15	June 27	1	31.0	30.0	1.0	11.0	10.0	1.0	14.0	0.40	1.0	20.0	19,000	4.8
June 29	July 11	1	24.0	23.0	1.0	8.0	8.0	0.0	13.0	0.40	1.0	25.0	92,000	5.5
Aug. 10	Aug. 22	1	29.0	23.0	6.0	5.0	5.0	0.0	14.0	0.60	5.0	18.0	8,400	-------
Aug. 24	Sept. 5	1	31.0	23.0	8.0	6.0	4.0	2.0	16.0	0.20	2.0	18.0	11,800	4.9
Oct. 5	Oct. 17	1	17.0	11.0	6.0	7.0	4.0	3.0	21.0	0.00	1.0	34.0	150,000	5.1
TABLE No. 37.														
Effluent From Six-foot Sprinkling Filter 1″ to 3″ Stone.														
July 13	July 25	1	45.0	37.0	8.0	6.0	4.0	2.0	12.0	1.00	4.0	16.0	290,000	5.4
July 27	Aug. 8	1	36.0	19.0	17.0	7.0	5.0	2.0	10.0	1.80	7.0	19.0	440,000	4.9
Sept. 7	Sept. 19	1	21.0	19.0	2.0	9.0	7.0	2.0	16.0	0.00	4.0	24.0	400,000	4.8
Sept. 21	Oct. 3	1	49.0	38.0	11.0	7.0	5.0	2.0	14.0	0.60	6.0	25.0	610,000	5.2
TABLE No. 38.														
Settled Effluent From Six-foot Sprinkling Filter 1″ to 3″ Stone.														
July 13	July 25	1	28.0	28.0	0.0	7.0	4.0	3.0	11.0	0.80	3.0	10.0	60,000	5.4
July 27	Aug. 8	1	20.0	13.0	7.0	7.0	5.0	2.0	10.0	1.40	7.0	18.0	57,000	4.9
Sept. 7	Sept. 19	1	18.0	18.0	0.0	8.0	7.0	1.0	16.0	0.00	3.0	23.0	63,000	4.8
Sept. 21	Oct. 3	1	34.0	28.0	6.0	5.0	4.0	1.0	15.0	0.30	6.0	20.0	25,000	5.2

TABLES No. 39 TO 42 INCLUSIVE.

Period Covered 1908		Number of Samples	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day
			Susp'd Solids			Nitrogen as						Oxygen Consumed		
						Organic								
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp	Free Ammonia	Nitrites	Nitrates			

TABLE No. 39.

Effluent From Seven and One-half-foot Sprinkling Filter 1″ to 3″ Stone.

June 8	June 13	1	6.0	4.0	2.0	13.0	11.0	2.0	15.0	0.20	0.5	20.0	480,000	5.0
June 15	June 27	1	28.0	24.0	4.0	10.0	8.0	2.0	13.0	1.20	4.0	17.0	300,000	4.8
June 29	July 11	1	18.0	18.0	0.0	8.0	7.0	1.0	12.0	0.80	4.0	20.0	370,000	5.5
Aug. 10	Aug. 22	1	37.0	29.0	8.0	6.5	5.5	1.0	9.5	1.20	8.0	12.0	320,000	-------
Aug. 24	Sept. 5	1	47.0	32.0	15.0	6.0	4.0	2.0	13.0	0.60	4.0	17.0	370,000	4.9
Oct. 5	Oct. 17	1	13.0	4.0	9.0	6.0	5.0	1.0	19.0	0.50	2.0	20.0	1,000,000	5.1

TABLE No. 40.

Settled Effluent From Seven and One-half-foot Sprinkling Filter 1″ to 3″ Stone

June 8	June 13	1	14.0	8.0	6.0	11.0	10.0	1.0	15.0	0.10	0.0	24.0	40,000	5.0
June 15	June 27	1	26.0	24.0	2.0	10.0	8.0	2.0	14.0	1.20	2.0	17.0	17,000	4.8
June 29	July 11	1	26.0	21.0	5.0	8.0	7.0	1.0	12.0	0.60	3.0	20.0	29,000	5.5
Aug. 10	Aug. 22	1	32.0	25.0	7.0	5.4	4.5	1.0	9.5	2.80	9.0	15.0	12,800	-------
Aug. 24	Sept. 5	1	33.0	25.0	8.0	7.0	6.0	1.0	13.0	0.60	4.0	14.0	7,200	4.9
Oct. 5	Oct. 17	1	15.0	5.0	10.0	6.0	5.0	1.0	19.0	0.40	2.0	22.0	210,000	5.1

TABLE No. 41.

Effluent From Nine-foot Sprinkling Filter 1″ to 3″ Stone.

July 13	July 25	1	36.0	27.0	9.0	5.0	3.0	2.0	10.0	1.20	5.0	7.0	290,000	5.4
July 27	Aug. 8	1	24.0	16.0	8.0	4.0	3.0	1.0	7.0	1.40	10.0	12.0	410,000	4.9
Sept. 7	Sept. 19	1	27.0	22.0	5.0	9.0	8.0	1.0	12.0	0.20	12.0	14.0	330,000	4.8
Sept. 21	Oct. 3	1	48.0	37.0	11.0	6.0	4.0	2.0	10.0	0.70	17.0	18.0	310,000	5.2

TABLE No. 42.

Settled Effluent From Nine-foot Sprinkling Filter 1″ to 3″ Stone.

July 13	July 25	1	20.0	16.0	4.0	5.0	4.0	1.0	10.0	1.40	7.0	11.0	51,000	5.4
July 27	Aug. 8	1	17.0	10.0	7.0	3.0	3.0	0.0	7.0	1.40	10.0	15.0	55,000	4.9
Sept. 7	Sept. 19	1	17.0	16.0	1.0	8.0	7.0	1.0	12.0	0.20	12.0	17.0	35,000	4.8
Sept. 21	Oct. 3	1	28.0	24.0	4.0	5.0	4.0	1.0	10.0	1.00	17.0	17.0	26,000	5.2

APPENDIX I

PART II

Monthly Averages of Analysis of Raw and Settled Sewage, Filtered Effluents and Settled Effluents

TABLES 1 TO 42 INCLUSIVE

TABLE No. 1.

PERIOD COVERED 1907-8		NUMBER OF SAMPLES	PARTS PER MILLION												Bacteria per C. C.	Rate of Flow, Gallons per 24 Hours
			SUSP'D SOLIDS			NITROGEN AS						OXYGEN CONSUMED				
						ORGANIC										
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates	Total	Solution	Suspension		
							RAW SEWAGE									
Aug. 1	Sept. 1	12	246.0	114.0	132.0	16.0	13.0	3.0	18	0.48	1.6	38	28	10	6,100,000	25,000
Sept. 4	Oct. 3	11	190.0	152.0	38.0	19.0	15.0	4.0	19	0.40	0.5	50	26	24	5,200,000	62,000
Oct. 6	Nov. 4	9	188.0	151.0	37.0	20.0	----	----	24	0.07	0.2	57	32	25	2,600,000	47,500
Nov. 15	Nov. 29	6	165.0	139.0	26.0	20.0	----	----	22	0.15	1.0	45	29	16	2,100,000	84,500
Dec. 3	Dec. 29	10	123.0	104.0	19.0	20.0	----	----	19	0.14	1.2	51	32	19	1,800,000	79,000
Jan. 6	Jan. 21	10	127.0	112.0	15.0	19.0	15.0	4.0	16	0.28	1.6	55	30	25	2,700,000	96,500
Feb. 2	Feb. 26	12	149.0	117.0	32.0	20.0	14.0	6.0	17	0.14	1.9	75	52	23	2,600,000	90,000
Feb. 29	Mar. 24	10	275.0	236.0	39.0	28.0	21.0	7.0	20	0.15	1.9	103	41	62	2,200,000	82,000
Mar. 27	April 29	2	165.0	135.0	30.0	25.0	20.0	5.0	20	0.20	1.5	62	21	41	2,400,000	91,800
April 30	May 26	2	104.0	90.0	14.0	19.0	16.0	3.0	17	0.65	1.3	102	62	40	3,000,000	95,700
June 8	July 11	3	88.0	74.3	13.7	15.0	13.0	2.0	14	0.06	1.0	79	43	36	2,600,000	69,700
July 13	Aug. 8	2	124.0	97.0	27.0	9.5	6.5	3.0	14	0.04	1.0	45	16	29	5,100,000	84,100
Aug. 10	Sept. 5	2	102.0	87.0	15.0	12.0	8.0	4.0	15	0.08	0.7	49	25	24	3,200,000	67,500
Sept. 7	Oct. 3	2	101.0	86.0	15.0	14.0	11.0	3.0	19	0.10	0.2	59	33	26	6,100,000	83,700
Oct. 5	Oct. 17	1	109.0	90.0	19.0	10.0	5.0	5.0	23	0.05	1.0	57	38	19	6,400,000	76,700

TABLE No. 2.

							SETTLED SEWAGE									
Aug. 1	Sept. 1	12	46.5	32.4	14.1	12.0	9.0	3.0	20	0.40	1.1	31	25	6	3,700,000	20.1
Sept. 4	Oct. 3	11	71.9	50.4	21.5	17.0	14.0	3.0	20	0.49	0.6	36	25	11	1,900,000	8.4
Oct. 6	Nov. 4	9	93.5	69.7	23.8	18.0	----	----	25	0.11	0.2	46	33	13	1,800,000	9.9
Nov. 15	Nov. 29	6	102.0	70.5	31.5	18.0	----	----	21	0.14	0.9	40	29	11	1,600,000	5.5
Dec. 3	Dec. 29	10	80.7	62.6	18.1	19.0	----	----	21	0.19	1.7	52	34	18	1.600,000	5.0
Jan. 6	Jan. 21	10	69.8	58.2	11.6	16.0	12.0	4.0	17	0.14	1.4	48	37	11	1,200,000	4.9
Feb. 2	Feb. 26	12	66.3	50.8	15.5	17.0	15.0	2.0	16	0.12	1.6	61	51	10	1,100,000	5.2
Feb. 29	Mar. 24	10	68.2	60.7	7.5	16.0	13.0	3.0	18	0.13	1.9	58	42	16	1,300,000	5.5
Mar. 27	April 29	2	89.8	77.0	12.8	19.0	16.0	3.0	21	0.13	1.0	59	37	22	1,400,000	5.4
April 30	May 26	2	84.5	74.0	10.5	15.0	13.0	2.0	20	0.08	0.8	90	62	28	1,500,000	5.2
June 8	July 11	3	54.3	48.3	6.0	12.0	11.0	1.0	16	0.03	0.7	43	30	13	1,800,000	7.3
July 13	Aug. 8	2	58.5	52.5	6.0	8.0	5.5	2.5	16	0.07	1.0	33	18	15	3,300,000	6.2
Aug. 10	Sept. 5	2	66.5	51.0	15.5	8.5	7.0	1.5	18	0.05	0.7	38	26	12	2,600,000	7.5
Sept. 7	Oct. 3	2	55.0	46.5	8.5	16.0	13.0	3.0	21	0.03	0.1	41	30	11	2,400,000	6.3
Oct. 5	Oct. 17	1	51.0	41.0	10.0	8.0	5.0	3.0	25	0.05	1.0	45	32	13	4,100,000	6.7

TABLE No. 3.

EFFLUENT FROM SIX-FOOT SPRINKLING FILTER ½″ TO 1½″ STONE

PERIOD COVERED 1907-8		NUMBER OF SAMPLES	PARTS PER MILLION											Rate of Filtration Million Gallons per Acre per Day			POPULATION	
			SUSP'D SOLIDS			NITROGEN AS												
						ORGANIC												
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates	Oxygen Consumed	Bacteria per C. C.	Maximum	Minimum	Average	Per Acre	Per Acre Foot
Aug. 1	Sept. 1	11	26.7	13.6	13.1	11.0	9.4	1.6	8.6	1.85	16.0	14	270,000	3.1	1.3	1.9	44,233	7,372
Sept. 4	Sept. 17	5	35.4	22.5	12.9	8.4	7.8	0.6	12.0	1.22	10.0	19	----------	3.8	2.6	3.2	76,113	12,685
Oct. 22	Oct. 27	3	32.7	24.7	8.0	16.0	----	----	21.0	0.20	1.0	19	320,000	5.1	2.8	3.6	90,539	15,090
Nov. 21	Nov. 26	3	51.3	32.0	19.3	11.0	----	----	14.0	0.90	10.0	16	160,000	5.3	2.2	3.4	48,258	8,043
Dec. 3	Dec. 29	7	56.3	32.4	23.9	11.0	----	----	15.0	0.47	11.0	20	240,000	5.5	2.3	2.8	49,454	8,242
Jan. 7	Jan. 30	6	48.8	37.2	11.6	7.8	5.7	2.1	13.0	0.54	8.3	22	280,000	5.2	3.1	3.7	49,454	8,242
Feb. 2	Feb. 25	6	53.7	40.3	13.4	9.5	7.2	2.3	13.0	0.16	10.0	26	330,000	4.6	2.5	3.6	49,454	8,242
Mar. 1	Mar. 24	5	41.2	32.2	9.0	9.0	7.0	2.0	12.0	0.22	13.0	21	610,000	5.0	3.0	3.3	49,454	8,242
Mar. 27	April 29	2	53.0	36.5	16.5	11.0	9.0	2.0	15.0	0.08	9.5	24	350,000	5.5	3.0	4.4	49,454	8,242
April 30	May 7	1	63.0	47.0	16.0	14.0	10.0	4.0	16.0	0.10	10.0	33	460,000	5.5	5.2	5.3	49,454	8,242

TABLE No. 4.

SETTLED EFFLUENT FROM SIX-FOOT SPRINKLING FILTER ½″ TO 1½″ STONE

Aug. 1	Sept. 1	11	8.3	4.6	3.7	9.9	8.9	1.0	8.7	2.07	17.0	13	260,000	3.1	1.3	1.9	-------	-------
Sept. 4	Sept. 17	5	15.4	11.3	4.1	8.8	8.2	0.6	12.0	1.24	9.0	18	----------	3.8	2.6	3.2	-------	-------
Oct. 22	Oct. 27	3	29.0	24.3	4.7	13.0	----	----	22.0	0.13	3.3	19	160,000	5.1	2.8	3.6	-------	-------
Nov. 21	Nov. 26	3	26.7	18.0	8.7	10.0	----	----	13.0	1.03	10.0	12	150,000	5.3	2.2	3.4	-------	-------
Dec. 3	Dec. 29	7	31.4	21.4	10.0	9.9	----	----	15.0	0.31	9.9	17	140,000	5.5	2.3	2.8	-------	-------
Jan. 7	Jan. 30	6	40.8	28.8	12.0	7.3	4.5	2.8	14.0	0.53	8.2	19	120,000	5.2	3.1	3.7	-------	-------
Feb. 2	Feb. 25	6	30.7	23.3	7.4	8.5	7.5	1.0	13.0	0.19	9.7	23	170,000	4.6	2.5	3.6	-------	-------
Mar. 1	Mar. 24	5	21.7	15.5	6.2	8.8	7.8	1.0	13.0	0.16	11.0	19	140,000	5.0	3.0	3.3	-------	-------
Mar. 27	April 29	2	22.5	15.0	7.5	11.0	10.0	1.0	15.0	0.15	9.5	19	180,000	5.5	3.0	4.4	-------	-------
April 30	May 7	1	37.0	30.0	7.0	12.0	10.0	2.0	16.0	0.10	10.0	23	190,000	5.5	5.2	5.3	-------	-------

TABLE No. 5.

EFFLUENT FROM NINE-FOOT SPRINKLING FILTER ½″ TO 1½″ STONE.

Aug. 1	Sept. 1	12	17.9	8.9	9.0	9.4	7.7	1.7	6.6	1.26	14.0	11	160,000	3.1	1.3	1.9	44,233	4,915
Sept. 4	Sept. 17	5	27.5	16.3	11.2	8.6	8.0	0.6	9.4	1.24	14.0	13	----------	3.8	2.6	3.2	76,113	8,457
Oct. 22	Oct. 27	3	49.5	27.5	22.0	13.0	----	----	20.0	0.73	3.7	15	160,000	5.1	2.8	3.6	90,539	10,060
Nov. 21	Nov. 26	3	66.7	35.3	31.4	10.0	----	----	12.0	0.83	15.0	13	130,000	5.3	2.2	3.4	48,258	5,362
Dec. 3	Dec. 29	7	66.4	34.6	31.8	12.0	----	----	12.0	0.53	17.0	15	110,000	5.5	2.3	2.8	49,454	5,495
Jan. 7	Jan. 30	6	59.5	41.3	18.2	9.7	5.4	4.3	9.9	0.58	12.0	15	150,000	5.2	2.8	3.7	49,454	5,495
Feb. 2	Feb. 25	6	38.7	27.5	11.2	9.3	7.2	2.1	9.1	0.16	13.0	19	120,000	4.6	2.5	3.6	49,454	5,495
Mar. 1	Mar. 24	5	36.2	26.1	10.1	9.8	6.8	3.0	7.4	0.20	18.0	16	160,000	5.0	3.0	3.3	49,454	5,495
Mar. 27	April 29	2	49.5	30.0	19.5	7.0	6.5	0.5	13.0	0.08	20.0	19	150,000	5.5	3.0	4.4	49,454	5,495
April 30	May 7	1	47.0	34.0	13.0	10.0	7.0	3.0	10.0	0.10	20.0	23	190,000	5.5	5.2	5.3	49,454	5.495

TABLE No. 6.

SETTLED EFFLUENT FROM NINE-FOOT SPRINKLING FILTER ½″ TO 1½″ STONE

Aug. 1	Sept. 1	12	12.7	6.6	6.1	9.7	8.8	0.9	6.6	1.54	20.0	11	210,000	3.1	1.3	1.9	-------	-------
Sept. 4	Sept. 17	5	17.6	11.5	6.1	8.4	7.8	0.6	11.0	1.26	15.0	14	----------	3.8	2.6	3.2	-------	-------
Oct. 22	Oct. 27	3	39.0	26.5	12.5	13.0	----	----	21.0	0.73	2.7	16	140,000	5.1	2.8	3.6	-------	-------
Nov. 21	Nov. 26	3	40.7	22.7	18.0	9.0	----	----	12.0	0.70	15.0	12	150,000	5.3	2.2	3.4	-------	-------
Dec. 3	Dec. 29	7	33.4	17.9	15.5	10.0	----	----	13.0	0.46	17.0	14	90,000	5.5	2.3	2.8	-------	-------
Jan. 7	Jan. 30	6	38.7	27.5	11.2	7.7	4.7	3.0	11.0	0.49	12.0	14	110,000	5.2	3.1	3.7	-------	-------
Feb. 2	Feb. 25	6	29.8	22.0	7.8	8.3	6.3	2.0	9.9	0.14	14.0	18	100,000	4.6	2.5	3.6	-------	-------
Mar. 1	Mar. 24	5	27.1	19.5	7.6	7.7	6.5	1.2	7.5	0.16	18.0	16	130,000	5.0	3.0	3.3	-------	-------
Mar. 27	April 29	2	31.0	16.5	14.5	10.0	8.5	1.5	10.0	0.15	20.0	17	130,000	5.5	3.0	4.4	-------	-------
April 30	May 7	1	30.0	24.0	6.0	10.0	8.0	2.0	10.0	0.10	20.0	21	130,000	5.5	5.2	5.3	-------	-------

TABLE No. 7.

PERIOD COVERED 1907-8		NUMBER OF SAMPLES	PARTS PER MILLION										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day			POPULATION	
			SUSP'D SOLIDS			NITROGEN AS						Oxygen Consumed						
						ORGANIC												
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates			Maximum	Minimum	Average	Per Acre	Per Acre Foot
Effluent from Twelve-foot Sprinkling Filter ½″ to 1½″ Stone																		
Aug. 1	Sept. 1	12	10.7	6.0	4.7	9.5	8.7	0.8	4.9	1.35	18.0	10	150,000	3.1	1.3	1.9	44,233	3,686
Sept. 4	Sept. 17	5	23.4	12.1	11.3	9.2	8.6	0.6	6.5	1.26	19.0	13	----------	3.8	2.6	3.2	76,113	6,343
Oct. 22	Oct. 27	3	42.0	23.3	18.7	10.0	----	----	20.0	1.00	3.3	14	160,000	5.1	2.8	3.6	90,539	7,545
Nov. 21	Nov. 26	3	76.0	32.0	44.0	11.0	----	----	11.0	0.80	15.0	13	100,000	5.3	2.2	3.4	48,258	4,022
Dec. 3	Dec. 29	7	63.0	30.0	33.0	10.0	----	----	9.8	0.50	19.0	14	120,000	5.5	2.3	2.8	49,454	4,121
Jan. 7	Jan. 30	6	55.8	35.3	20.5	8.3	5.9	2.4	7.4	0.48	17.0	16	130,000	5.2	3.0	3.7	49,454	4,121
Feb. 2	Feb. 25	6	37.7	24.7	13.0	8.0	6.8	1.2	6.8	0.13	17.0	17	80,000	4.6	2.5	3.6	49,454	4,121
Mar. 1	Mar. 24	5	53.2	31.2	22.0	8.9	7.5	1.4	5.5	0.30	19.0	16	110,000	5.0	3.0	3.3	49,454	4,121
Mar. 27	April 29	2	42.0	28.0	14.0	10.0	9.0	1.0	7.5	0.08	21.0	18	120,000	5.5	3.0	4.4	49,454	4,121
April 30	May 7	1	49.0	32.0	17.0	9.5	8.5	1.0	6.5	0.10	20.0	22	160,000	5.5	5.2	5.3	49,454	4,121

TABLE No. 8.

Settled Effluent from Twelve-foot Sprinkling Filter ½″ to 1½″ Stone

Aug. 1	Sept. 1	12	8.7	5.6	3.1	10.0	8.0	2.0	5.4	1.36	20.0	10	130,000	3.1	1.3	1.9	-------	-------
Sept. 4	Sept. 17	5	14.3	9.7	4.6	11.0	8.9	2.1	6.7	1.34	18.0	12	----------	3.8	2.6	3.2	-------	-------
Oct. 22	Oct. 27	3	40.0	23.5	16.5	11.0	----	----	20.0	1.00	3.3	15	140,000	5.1	2.8	3.6	-------	-------
Nov. 21	Nov. 26	3	44.7	22.0	22.7	10.0	----	----	11.0	0.93	18.0	11	100,000	5.3	2.2	3.4	-------	-------
Dec. 3	Dec. 29	7	34.1	17.0	17.1	10.0	----	----	9.7	0.54	22.0	14	50,000	5.5	2.3	2.8	-------	-------
Jan. 7	Jan. 30	6	38.3	26.0	12.3	8.5	6.2	2.3	7.2	0.49	16.0	15	2,600	5.2	3.1	3.7	-------	-------
Feb. 2	Feb. 25	6	25.2	16.8	8.4	6.8	5.8	1.0	6.8	0.12	17.0	17	10,100	4.6	2.5	3.6	-------	-------
Mar. 1	Mar. 24	5	26.1	17.4	8.7	7.9	7.1	0.8	5.5	0.19	20.0	15	1,170	5.0	3.0	3.3	-------	-------
Mar. 27	April 29	2	33.5	19.5	14.0	9.6	7.6	2.0	7.9	0.08	22.0	18	1,300	5.5	3.0	4.4	-------	-------
April 30	May 7	1	30.0	21.0	9.0	13.0	9.5	3.5	6.5	0.10	20.0	20	1,800	5.5	5.2	5.3	-------	-------

TABLE No. 9.

Effluent from Six-foot Sprinkling Filter 1″ to 2″ Stone

Aug. 1	Sept. 1	11	33.7	16.2	17.5	11.0	8.0	3.0	10.0	2.17	11.0	17	330,000	3.1	1.3	1.9	44,233	7,372
Sept. 4	Sept. 17	5	32.9	20.2	12.7	10.0	9.0	1.0	16.0	1.24	9.6	21	----------	3.8	2.6	3.2	76,113	12,685
Oct. 22	Oct. 27	3	40.3	30.7	9.6	14.0	----	----	20.0	0.30	0.7	24	230,000	5.1	2.8	3.6	90,539	15,090
Nov. 21	Nov. 26	3	76.0	40.7	35.3	13.0	----	----	15.0	1.13	8.0	17	210,000	5.3	2.2	3.4	48,258	8,043
Dec. 3	Dec. 29	7	75.0	41.6	33.4	13.0	----	----	17.0	0.73	9.3	25	210,000	5.5	2.3	2.8	49,454	8,242
Jan. 7	Jan. 30	6	63.0	52.3	10.7	9.7	8.2	1.5	14.0	0.62	6.8	24	160,000	5.2	3.1	3.7	49,454	8,242
Feb. 2	Feb. 25	6	75.8	59.0	16.8	11.0	9.2	1.8	14.0	0.23	8.0	30	170,000	4.6	2.5	3.6	49,454	8,242
Mar. 1	Mar. 24	5	124.0	103.0	21.0	14.0	9.8	4.2	14.0	0.28	9.4	39	300,000	5.0	3.0	3.3	49,454	8,242
Mar. 27	April 29	2	81.0	62.5	18.5	13.0	11.0	2.0	16.0	0.10	7.0	35	240,000	5.5	3.0	4.4	49,454	8,242
April 30	May 7	1	55.0	38.0	17.0	12.0	10.0	2.0	16.0	0.40	12.0	33	180,000	5.5	5.2	5.3	49,454	8,242

TABLE No. 10.

Settled Effluent from Six-foot Sprinkling Filter 1″ to 2″ Stone

Aug. 1	Sept. 1	11	11.4	7.3	4.1	8.4	7.0	1.4	12.0	2.60	13.0	14	250,000	3.1	1.3	1.9	-------	-------
Sept. 4	Sept. 17	5	19.5	14.6	4.9	9.6	8.6	1.0	16.0	1.08	6.0	16	----------	3.8	2.6	3.2	-------	-------
Oct. 22	Oct. 27	3	29.0	21.3	7.7	13.0	----	----	21.0	0.60	0.7	19	310,000	5.1	2.8	3.6	-------	-------
Nov. 21	Nov. 26	3	55.3	32.7	22.6	13.0	----	----	16.0	1.07	6.7	15	200,000	5.3	2.2	3.4	-------	-------
Dec. 3	Dec. 29	7	44.3	24.3	20.0	11.0	----	----	17.0	0.53	11.0	18	180,000	5.5	2.3	2.8	-------	-------
Jan. 7	Jan. 30	6	38.5	29.8	8.7	8.8	6.3	2.5	14.0	0.55	7.3	19	150,000	5.2	3.1	3.7	-------	-------
Feb. 2	Feb. 25	6	30.2	24.0	6.2	9.2	8.0	1.2	15.0	0.24	8.2	25	140,000	4.6	2.5	3.6	-------	-------
Mar. 1	Mar. 24	5	26.6	24.2	2.4	9.2	7.4	1.8	14.0	0.30	10.0	20	220,000	5.0	3.0	3.3	-------	-------
Mar. 27	April 29	2	38.0	27.5	10.5	12.0	10.0	2.0	16.0	0.13	7.5	23	180,000	5.5	3.0	4.4	-------	-------
April 30	May 7	1	44.0	33.0	11.0	10.0	9.0	1.0	16.0	0.40	10.0	26	150,000	5.5	5.2	5.3	-------	-------

TABLE No. 11.

Period Covered 1907-8		Number of Samples	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day			Population	
			Susp'd Solids			Nitrogen as						Oxygen Consumed						
						Organic			Free Ammonia	Nitrites	Nitrates							
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.						Maximum	Minimum	Average	Per Acre	Per Acre Foot
Effluent from Nine-foot Sprinkling Filter 1" to 2" Stone																		
Aug. 1	Sept. 1	11	13.7	8.7	5.0	9.4	8.7	0.7	7.9	2.20	14.0	13	280,000	3.1	1.3	1.9	44,233	4,915
Sept. 4	Sept. 17	5	21.7	14.0	7.7	8.3	7.9	0.4	11.0	1.52	13.0	14	----------	3.8	2.6	3.2	76,113	8,457
Oct. 22	Oct. 27	3	24.3	18.3	6.0	12.0	----	----	19.0	0.93	3.7	15	190,000	5.1	2.8	3.6	90,539	10,060
Nov. 21	Nov. 26	3	60.0	31.3	28.7	12.0	----	----	11.0	0.90	13.0	12	140,000	5.3	2.2	3.4	48,258	5,362
Dec. 3	Dec. 29	7	95.3	43.8	51.5	12.0	----	----	13.0	0.60	15.0	19	170,000	5.5	2.3	2.8	49,454	5,495
Jan. 7	Jan. 30	6	46.8	36.3	10.5	10.0	7.0	3.0	11.0	0.73	10.0	19	130,000	5.2	3.1	3.7	49,454	5,495
Feb. 2	Feb. 25	6	53.7	38.3	15.4	8.8	7.0	1.8	12.0	0.24	13.0	21	90,000	4.6	2.5	3.6	49,454	5,495
Mar. 1	Mar. 24	5	74.0	57.2	16.8	11.0	7.4	3.6	10.0	0.36	17.0	21	160,000	5.0	3.0	3.3	49,454	5,495
Mar. 27	April 29	2	56.5	36.5	20.0	11.0	9.5	1.5	13.0	0.20	25.0	20	140,000	5.5	3.0	4.4	49,454	5,495
April 30	May 7	1	50.0	36.0	14.0	11.0	10.0	1.0	12.0	0.20	25.0	28	150,000	5.5	5.2	5.3	49,454	5.495

TABLE No. 12.

Settled Effluent from Nine-foot Sprinkling Filter 1" to 2" Stone

Aug. 1	Sept. 1	11	9.9	6.2	3.7	7.8	6.6	1.2	8.5	2.50	15.0	12	240,000	3.1	1.3	1.9	------	------
Sept. 4	Sept. 17	5	14.5	10.0	4.5	8.1	7.4	0.7	12.0	1.44	12.0	13	----------	3.8	2.6	3.2	------	------
Oct. 22	Oct. 27	3	25.0	16.7	8.3	20.0	----	----	18.0	0.93	5.3	15	190,000	5.1	2.8	3.6	------	------
Nov. 21	Nov. 26	3	42.0	22.0	20.0	10.0	----	----	11.0	1.07	15.0	11	110,000	5.3	2.2	3.4	------	------
Dec. 3	Dec. 29	7	45.0	21.3	23.7	11.0	----	----	13.0	0.54	14.0	16	130,000	5.5	2.3	2.8	------	------
Jan. 7	Jan. 30	6	40.0	27.5	12.5	8.9	7.7	1.2	11.0	0.53	11.0	16	160,000	5.2	3.1	3.7	------	------
Feb. 2	Feb. 25	6	31.5	23.5	8.0	8.3	6.8	1.5	12.0	0.22	12.0	20	110,000	4.6	2.5	3.6	------	------
Mar. 1	Mar. 24	5	25.4	19.6	5.8	8.2	6.3	1.9	10.0	0.32	16.0	19	120,000	5.0	3.0	3.3	------	------
Mar. 27	April 29	2	34.5	24.5	10.0	10.0	8.5	1.5	13.0	0.18	19.0	19	120,000	5.5	3.0	4.4	------	------
April 30	May 7	1	36.0	25.0	11.0	12.0	9.0	3.0	12.0	0.30	20.0	28	240,000	5.5	5.2	5.3	------	------

TABLE No. 13.

Effluent from Twelve-foot Sprinkling Filter 1" to 2" Stone

Aug. 1	Sept. 1	11	14.4	8.0	6.4	9.3	8.4	0.9	5.6	2.01	18.0	12	200,000	3.1	1.3	1.9	44,233	3,686
Sept. 4	Sept. 17	5	32.5	16.8	15.7	8.8	8.4	0.4	9.4	1.70	16.0	15	----------	3.8	2.6	3.2	76,113	6,343
Oct. 22	Oct. 27	3	22.3	14.0	8.3	11.0	----	----	18.0	0.80	6.3	16	210,000	5.1	2.8	3.6	90,539	7,545
Nov. 21	Nov. 26	3	62.0	34.7	27.3	12.0	----	----	10.0	0.97	17.0	16	200,000	5.3	2.2	3.4	48,258	4,022
Dec. 3	Dec. 29	7	79.7	43.4	36.3	13.0	----	----	12.0	0.54	19.0	20	150,000	5.5	2.3	2.8	49,454	4,121
Jan. 7	Jan. 30	6	39.7	30.7	9.0	7.7	6.0	1.7	8.5	0.45	15.0	15	110,000	5.2	3.0	3.7	49,454	4,121
Feb. 2	Feb. 25	6	36.0	26.2	9.8	9.1	6.9	2.2	8.6	0.25	16.0	18	110,000	4.6	2.5	3.6	49,454	4,121
Mar. 1	Mar. 24	5	34.2	27.2	7.0	8.3	7.1	1.2	7.1	0.28	20.0	18	150,000	5.0	3.0	3.3	49,454	4,121
Mar. 27	April 29	2	55.5	39.0	16.5	12.0	10.0	2.0	8.5	0.08	24.0	20	120,000	5.5	3.0	4.4	49,454	4,121
April 30	May 7	1	50.0	32.0	18.0	11.0	9.0	2.0	8.0	0.10	25.0	25	160,000	5.5	5.2	5.3	49,454	4,121

TABLE No. 14.

Settled Effluent from Twelve-foot Sprinkling Filter 1" to 2" Stone

Aug. 1	Sept. 1	11	9.8	6.5	3.3	8.8	7.8	1.0	5.9	2.35	19.0	13	140,000	3.1	1.3	1.9	------	------
Sept. 4	Sept. 17	5	14.4	7.4	7.0	9.0	8.2	0.8	9.8	1.62	14.0	13	----------	3.8	2.6	3.2	------	------
Oct. 22	Oct. 27	3	26.3	20.0	6.3	11.0	----	----	19.0	1.20	6.3	14	170,000	5.1	2.8	3.6	------	------
Nov. 21	Nov. 26	3	46.0	22.7	23.3	11.0	----	----	10.0	0.87	17.0	10	120,000	5.3	2.2	3.4	------	------
Dec. 3	Dec. 29	7	43.7	23.1	20.6	10.0	----	----	11.0	0.56	20.0	15	100,000	5.5	2.3	2.8	------	------
Jan. 7	Jan. 30	6	32.0	24.0	8.0	7.4	5.7	1.7	8.9	0.43	15.0	13	100,000	5.2	3.0	3.7	------	------
Feb. 2	Feb. 25	6	33.0	21.0	12.0	7.6	6.8	0.8	8.6	0.14	16.0	16	90,000	4.6	2.5	3.6	------	------
Mar. 1	Mar. 24	5	28.0	18.0	10.0	8.3	7.1	1.2	6.9	0.20	20.0	15	110,000	5.0	3.0	3.3	------	------
Mar. 27	April 29	2	40.0	27.0	13.0	11.0	10.0	1.0	8.5	0.20	23.0	17	100,000	5.5	3.0	4.4	------	------
April 30	May 7	1	37.0	23.0	14.0	9.0	9.0	0.0	8.0	0.10	25.0	20	250,000	5.5	5.2	5.3	------	------

TABLE No. 15.

EFFLUENT FROM SIX-FOOT SPRINKLING FILTER 2″ TO 4″ STONE.

PERIOD COVERED 1907-8		NUMBER OF SAMPLES	PARTS PER MILLION										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day			POPULATION	
			SUSP'D SOLIDS			NITROGEN AS						Oxygen Consumed						
						ORGANIC												
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates			Maximum	Minimum	Average	Per Acre	Per Acre Foot
Sept. 20	Oct. 3	6	36.2	29.2	7.0	13.0	12.0	1.0	16.0	0.57	2.0	18	1,200,000	4.0	2.9	3.6	76,113	12,685
Oct. 6	Nov. 4	6	117.0	63.7	53.3	15.0	----	----	22.0	0.52	1.0	30	530,000	5.1	1.4	3.2	90,539	15,090
Nov. 15	Nov. 29	3	108.0	78.7	29.3	20.0	----	----	24.0	0.80	1.7	34	500,000	5.3	2.0	4.1	96,517	16,086
Dec. 11	Dec. 16	3	50.7	34.0	16.7	16.0	----	----	17.0	0.87	5.0	21	310,000	5.5	2.5	4.0	49,454	8,242
Jan. 6	Jan. 21	4	52.0	44.5	7.5	9.0	7.3	1.7	17.0	0.23	4.5	29	300,000	5.2	3.1	3.6	49,454	8,242
Feb. 3	Feb. 26	6	48.7	38.2	10.5	11.0	8.5	2.5	16.0	0.28	4.0	30	740,000	4.8	2.5	3.7	49,454	8,242
Feb. 29	Mar. 23	5	51.4	42.0	9.4	12.0	9.2	2.8	15.0	0.24	4.2	28	420,000	5.0	3.0	3.2	49,454	8,242
Mar. 28	April 10	1	52.0	50.0	2.0	18.0	16.0	2.0	18.0	0.40	2.0	28	300,000	4.1	3.0	3.6	49,454	8,242
May 25	May 26	1	123.0	105.0	18.0	15.0	12.0	3.0	13.0	0.20	1.0	102	----------	-----	-----	-----	49,454	8,242
July 13	Aug. 8	2	61.5	44.5	17.0	8.0	5.5	2.5	13.0	1.00	3.5	23	540,000	5.6	4.4	5.1	49,454	8,242
Sept. 7	Oct. 3	2	39.5	34.5	5.0	8.5	7.0	1.5	17.0	0.50	1.8	24	460,000	5.6	4.8	5.2	49,454	8,242

TABLE No. 16.

SETTLED EFFLUENT FROM SIX-FOOT SPRINKLING FILTER 2″ TO 4″ STONE.

Sept. 20	Oct. 3	6	27.0	20.7	6.3	14.0	13.0	1.0	16.0	0.62	2.2	14	1,100,000	4.0	2.9	3.6	-------	-------
Oct. 6	Nov. 4	6	62.4	4.0	22.4	12.0	----	----	23.0	0.50	1.2	22	260,000	5.1	1.4	3.2	-------	-------
Nov. 15	Nov. 29	3	46.0	32.0	14.0	17.0	----	----	23.0	0.80	2.0	24	120,000	5.3	2.0	4.1	-------	-------
Dec. 11	Dec. 16	3	36.7	21.3	15.4	12.0	----	----	18.0	0.63	5.0	18	240,000	5.5	2.5	4.0	-------	-------
Jan. 6	Jan. 21	4	25.0	21.5	3.5	9.3	6.5	2.8	17.0	0.28	4.5	21	260,000	5.2	3.1	3.6	-------	-------
Feb. 3	Feb. 26	6	31.7	24.3	7.4	9.5	7.7	1.8	16.0	0.31	4.0	26	480,000	4.8	2.5	3.7	-------	-------
Feb. 29	Mar. 23	5	30.0	24.8	5.2	11.0	8.2	2.8	16.0	0.28	4.4	23	320,000	5.0	3.0	3.2	-------	-------
Mar. 28	April 10	1	42.0	42.0	0.0	18.0	16.0	2.0	18.0	0.20	2.0	21	270,000	4.1	3.0	3.6	-------	-------
May 25	May 26	1	68.0	50.0	18.0	13.0	11.0	2.0	13.0	0.20	1.0	62	----------	-----	-----	-----	-------	-------
July 13	Aug. 8	2	33.0	24.0	9.0	7.0	5.0	2.0	13.0	0.95	4.0	14	500,000	5.6	4.4	5.1	-------	-------
Sept. 7	Oct. 3	2	26.0	22.5	3.5	7.5	6.5	1.0	17.0	0.45	2.3	19	400,000	5.6	4.8	5.2	-------	-------

TABLE No. 17.

EFFLUENT FROM NINE-FOOT SPRINKLING FILTER 2″ TO 4″ STONE

Sept. 20	Oct. 3	6	40.7	25.4	15.3	16.0	13.0	3.0	15.0	0.97	3.8	13	1,200,000	4.0	2.9	3.6	76,113	8,457
Oct. 6	Nov. 4	6	104.0	56.5	47.5	12.0	----	----	20.0	1.00	3.7	23	330,000	5.1	1.4	3.2	90,539	10,060
Nov. 15	Nov. 29	3	74.7	48.7	26.0	17.0	----	----	23.0	1.30	4.0	23	530,000	5.3	2.0	4.1	96,517	10,724
Dec. 11	Dec. 16	3	44.7	28.0	16.7	14.0	----	----	15.0	0.77	7.3	16	290,000	5.5	2.5	4.0	49,454	5,495
Jan. 6	Jan. 21	4	69.9	55.7	14.2	9.5	7.5	2.0	14.0	0.28	9.0	22	1,000,000	5.2	3.1	3.6	49,454	5,495
Feb. 3	Feb. 26	6	45.0	35.5	9.5	8.7	6.5	2.2	14.0	0.23	8.8	24	600,000	4.8	2.5	3.7	49,454	5,495
Feb. 29	Mar. 23	5	74.0	56.4	17.6	12.0	10.0	2.0	12.0	0.30	12.0	24	410,000	5.0	3.0	3.2	49,454	5,495
Mar. 28	April 10	1	156.0	124.0	32.0	23.0	17.0	6.0	15.0	0.40	15.0	28	400,000	4.1	3.0	3.6	49,454	5,495
May 25	May 26	1	61.0	53.0	8.0	14.0	12.0	2.0	11.0	0.40	5.0	66	----------	-----	-----	-----	49,454	5,495
July 13	Aug. 8	2	41.5	33.0	8.5	7.8	4.8	3.0	8.8	1.70	8.5	13	660,000	5.6	4.4	5.1	49,454	5,495
Sept. 7	Oct. 3	2	35.5	29.0	6.5	8.0	6.5	1.5	14.0	0.40	13.0	20	460,000	5.6	4.8	5.2	49,454	5,495

TABLE No. 18.

SETTLED EFFLUENT FROM NINE-FOOT SPRINKLING FILTER 2″ TO 4″ STONE

Sept. 20	Oct. 3	6	30.7	24.2	6.5	13.0	12.0	1.0	15.0	0.87	3.9	13	1,000,000	4.0	2.9	3.6	-------	-------
Oct. 6	Nov. 4	6	51.9	34.2	17.7	11.0	----	----	20.0	0.92	4.2	20	250,000	5.1	1.4	3.2	-------	-------
Nov. 15	Nov. 29	3	75.3	44.0	31.3	14.0	----	----	22.0	1.30	4.3	22	350,000	5.3	2.0	4.1	-------	-------
Dec. 11	Dec. 16	3	26.0	16.7	9.3	12.0	----	----	15.0	0.57	5.0	15	170,000	5.5	2.5	4.0	-------	-------
Jan. 6	Jan. 21	4	19.5	16.0	3.5	9.3	7.3	2.0	14.0	0.65	8.5	19	370,000	5.2	3.1	3.6	-------	-------
Feb. 3	Feb. 26	6	25.8	19.9	5.9	8.5	7.3	1.2	13.0	0.27	8.7	23	240,000	4.8	2.5	3.7	-------	-------
Feb. 29	Mar. 23	5	25.3	18.7	6.6	9.0	7.2	1.8	13.0	0.28	12.0	20	190,000	5.0	3.0	3.2	-------	-------
Mar. 28	April 10	1	42.0	30.0	12.0	21.0	15.0	6.0	15.0	0.30	10.0	19	170,000	4.1	3.0	3.6	-------	-------
May 25	May 26	1	49.0	46.0	3.0	13.0	11.0	2.0	11.0	0.20	2.0	62	----------	-----	-----	-----	-------	-------
July 13	Aug. 8	2	24.0	20.5	3.5	5.3	4.3	1.0	8.8	1.55	8.5	14	260,000	5.6	4.4	5.1	-------	-------
Sept. 7	Oct. 3	2	20.5	18.0	2.5	6.5	5.5	1.0	13.0	0.40	12.0	19	270,000	5.6	4.8	5.2	-------	-------

TABLE No. 19.

Period Covered 1907-8		Number of Samples	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day			Population	
			Susp'd Solids			Nitrogen as						Oxygen Consumed						
						Organic			Free Ammonia	Nitrites	Nitrates							
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.						Maximum	Minimum	Average	Per Acre	Per Acre Foot
Effluent from Twelve-foot Sprinkling Filter 2″ to 4″ Stone																		
Sept. 20	Oct. 3	6	45.3	26.7	18.6	14.0	13.0	1.0	14.0	1.08	4.2	14	1,200,000	4.0	2.9	3.6	76,113	6,343
Oct. 6	Nov. 4	6	77.7	44.2	33.5	11.0	----	----	18.0	1.23	4.7	22	200,000	5.1	1.4	3.2	90,539	7,545
Nov. 15	Nov. 29	3	88.7	48.0	40.7	15.0	----	----	21.0	1.90	8.0	24	440,000	5.3	2.0	4.1	96,517	8,043
Dec. 11	Dec. 16	3	36.7	22.7	14.0	12.0	----	----	14.0	0.60	9.0	14	210,000	5.5	2.5	4.0	49,454	4,121
Jan. 6	Jan. 21	4	32.0	24.7	7.3	8.4	6.9	1.5	12.0	0.23	14.0	18	320,000	5.2	3.1	3.6	49,454	4,121
Feb. 3	Feb. 26	6	39.3	30.0	9.3	7.9	6.6	1.3	12.0	0.23	10.0	22	260,000	4.8	2.5	3.7	49,454	4,121
Feb. 29	Mar. 23	5	47.8	36.2	11.6	9.4	8.2	1.2	11.0	0.24	14.0	22	190,000	5.0	3.0	3.2	49,454	4,121
Mar. 28	April 10	1	56.0	46.0	10.0	21.0	19.0	2.0	11.0	0.40	20.0	22	180,000	4.1	3.0	3.6	49,454	4,121
May 25	May 26	1	90.0	73.0	17.0	15.0	10.0	5.0	11.0	0.80	10.0	70	----------	-----	-----	-----	49,454	4,121
July 13	Aug. 8	2	48.5	28.0	20.5	6.3	4.8	1.5	6.3	1.80	19.0	16	340,000	5.6	4.4	5.1	49,454	4,121
Sept. 7	Oct. 3	2	31.5	26.0	5.5	7.5	6.0	1.5	11.0	0.90	16.0	19	330,000	5.6	4.8	5.2	49,454	4,121

TABLE No. 20.

Settled Effluent from Twelve-foot Sprinkling Filter 2″ to 4″ Stone																		
Sept. 20	Oct. 3	6	19.9	12.9	7.0	12.0	11.0	1.0	14.0	1.12	5.1	11	900,000	4.0	2.9	3.6	-------	-------
Oct. 6	Nov. 4	6	40.2	24.7	15.5	9.8	----	----	18.0	1.04	5.2	17	180,000	5.1	1.4	3.2	-------	-------
Nov. 15	Nov. 29	3	67.3	36.0	31.3	15.0	----	----	22.0	1.30	8.7	20	300,000	5.3	2.0	4.1	-------	-------
Dec. 11	Dec. 16	3	26.0	17.3	8.7	12.0	----	----	14.0	0.50	11.0	13	180,000	5.5	2.5	4.0	-------	-------
Jan. 6	Jan. 21	4	20.5	17.0	3.5	6.9	6.4	0.5	13.0	0.20	13.0	16	220,000	5.2	3.1	3.6	-------	-------
Feb. 3	Feb. 26	6	26.3	20.6	5.7	8.1	6.6	1.5	12.0	0.20	10.0	18	260,000	4.8	2.5	3.7	-------	-------
Feb. 29	Mar. 23	5	17.7	14.6	3.1	8.3	6.9	1.4	16.0	0.23	12.0	16	160,000	5.0	3.0	3.2	-------	-------
Mar. 28	April 10	1	28.0	28.0	0.0	19.0	17.0	2.0	11.0	0.30	10.0	18	160,000	4.1	3.0	3.6	-------	-------
May 25	May 26	1	63.0	54.0	9.0	12.0	10.0	2.0	11.0	0.60	8.0	52	----------	-----	-----	-----	-------	-------
July 13	Aug. 8	2	25.5	17.0	8.5	4.8	4.3	0.5	6.3	1.80	15.0	10	250,000	5.6	4.4	5.1	-------	-------
Sept. 7	Oct. 3	2	23.5	20.0	3.5	6.0	4.5	1.5	12.0	0.65	15.0	14	260,000	5.6	4.8	5.2	-------	-------

TABLE No. 21.

Effluent from Six-foot Sprinkling Filter 4″ to 6″ Stone																		
Sept. 20	Oct. 3	6	38.8	27.3	11.5	15.0	11.0	4.0	17.0	0.43	1.2	21	1,200,000	4.0	2.9	3.6	76,113	12,685
Oct. 6	Nov. 4	6	103.0	66.4	36.6	15.0	----	----	24.0	0.13	0.4	34	390,000	5.1	1.4	3.2	90,539	15,090
Nov. 15	Nov. 29	3	92.0	77.3	14.7	18.0	----	----	24.0	0.50	0.7	31	1,000,000	5.3	2.0	4.1	96,517	16,086
Dec. 11	Dec. 16	3	52.7	43.3	9.4	13.0	----	----	18.0	0.20	2.7	24	610,000	5.5	2.5	4.0	49,454	8,242
Jan. 6	Jan. 21	4	60.7	51.0	9.7	10.0	6.5	3.5	20.0	0.13	1.8	39	470,000	5.2	3.1	3.6	49,454	8,242
Feb. 3	Feb. 26	6	94.0	76.8	17.2	13.0	9.0	4.0	18.0	0.14	1.3	41	950,000	4.8	2.5	3.7	49,454	8,242
Feb. 29	Mar. 5	2	94.5	81.0	13.5	12.0	9.0	3.0	19.0	0.15	0.5	41	1,000,000	3.5	3.1	3.2	49,454	8,242

TABLE No. 22.

Settled Effluent from Six-foot Sprinkling Filter 4″ to 6″ Stone																		
Sept. 20	Oct. 3	6	31.9	27.7	4.2	16.0	14.0	2.0	16.0	0.58	1.4	19	1,500,000	4.0	2.9	3.6	-------	-------
Oct. 6	Nov. 4	6	61.5	41.4	20.1	12.0	----	----	23.0	0.27	0.8	31	400,000	5.1	1.4	3.2	-------	-------
Nov. 15	Nov. 29	3	53.3	43.3	10.0	18.0	----	----	24.0	0.40	1.0	33	880,000	5.3	2.0	4.1	-------	-------
Dec. 11	Dec. 16	3	35.3	25.3	10.0	14.0	----	----	18.0	0.23	1.7	26	610,000	5.5	2.5	4.0	-------	-------
Jan. 6	Jan. 21	4	34.4	29.4	5.0	11.0	7.8	3.2	19.0	0.17	1.8	29	610,000	5.2	3.1	3.6	-------	-------
Feb. 3	Feb. 26	6	47.1	37.9	9.2	13.0	9.8	3.2	17.0	0.13	1.3	34	840,000	4.8	2.5	3.7	-------	-------
Feb. 29	Mar. 5	2	25.8	21.8	4.0	12.0	9.0	3.0	18.0	0.15	0.5	36	630,000	3.5	3.1	3.2	-------	-------

TABLE No. 23.

PERIOD COVERED 1907-8		NUMBER OF SAMPLES	PARTS PER MILLION										BACTERIA PER C. C.	RATE OF FILTRATION MILLION GALLONS PER ACRE PER DAY			POPULATION	
			SUSP'D SOLIDS			NITROGEN AS						Oxygen Consumed						
						ORGANIC												
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates			Maximum	Minimum	Average	Per Acre	Per Acre Foot

EFFLUENT FROM NINE-FOOT SPRINKLING FILTER 4″ TO 6″ STONE

Sept. 20	Oct. 3	6	47.3	34.9	12.4	14.0	12.0	2.0	16.0	0.58	2.6	15	1,300,000	4.0	2.9	3.6	76,113	8,457
Oct. 6	Nov. 4	6	99.0	61.7	37.3	13.0	----	----	23.0	0.44	1.5	25	360,000	5.1	1.4	3.2	90,539	10,060
Nov. 15	Nov. 29	3	79.3	64.0	15.3	18.0	----	----	23.0	0.47	1.3	27	900,000	5.3	2.0	4.1	96,517	10,724
Dec. 11	Dec. 16	3	40.0	28.0	12.0	11.0	----	----	18.0	0.70	2.7	16	470,000	5.5	2.5	4.0	49,454	5,495
Jan. 6	Jan. 21	4	48.8	39.0	9.8	11.0	8.5	2.5	19.0	0.19	3.5	24	480,000	5.2	3.1	3.6	49,454	5,495
Feb. 3	Feb. 26	6	46.0	37.5	8.5	9.8	7.8	2.0	17.0	0.23	1.8	29	590,000	4.8	2.5	3.7	49,454	5,495
Feb. 29	Mar. 5	2	38.0	31.5	6.5	9.0	7.5	1.5	18.0	0.30	1.5	27	750,000	3.5	3.1	3.2	49,454	5,495

TABLE No. 24.

SETTLED EFFLUENT FROM NINE-FOOT SPRINKLING FILTER 4″ TO 6″ STONE

Sept. 20	Oct. 3	6	21.3	15.5	5.8	14.0	11.0	3.0	17.0	0.52	2.4	16	1,000,000	4.0	2.9	3.6	-------	-------
Oct. 6	Nov. 4	6	52.9	36.5	16.4	12.0	----	----	23.0	0.52	1.5	23	400,000	5.1	1.4	3.2	-------	-------
Nov. 15	Nov. 29	3	63.3	48.7	14.6	17.0	----	----	24.0	0.37	1.3	26	590,000	5.3	2.0	4.1	-------	-------
Dec. 11	Dec. 16	3	36.0	24.0	12.0	11.0	----	----	18.0	0.57	4.3	19	340,000	5.5	2.5	4.0	-------	-------
Jan. 6	Jan. 21	4	29.8	24.7	5.1	11.0	7.5	3.5	18.0	0.25	3.5	22	490,000	5.2	3.1	3.6	-------	-------
Feb. 3	Feb. 26	[illegible]	28.9	24.5	4.4	9.8	8.2	1.6	17.0	0.25	2.0	28	580,000	4.8	2.5	3.7	-------	-------
Feb. 29	Mar. 5	2	24.8	20.0	4.8	9.5	8.0	1.5	18.0	0.20	1.5	28	540,000	3.5	3.1	3.2	-------	-------

TABLE No. 25.

EFFLUENT FROM TWELVE-FOOT SPRINKLING FILTER 4″ TO 6″ STONE

Sept. 20	Oct. 3	6	37.0	26.2	10.8	14.0	11.0	3.0	15.0	0.74	3.2	13	1,000,000	4.0	2.9	3.6	76,113	6,343
Oct. 6	Nov. 4	6	98.5	58.3	40.2	13.0	----	----	22.0	0.60	1.9	24	350,000	5.1	1.4	3.2	90,539	7,545
Nov. 15	Nov. 29	3	80.7	52.7	28.0	16.0	----	----	23.0	1.00	2.0	24	570,000	5.3	2.0	4.1	96,517	8,043
Dec. 11	Dec. 16	3	63.3	38.7	24.6	13.0	----	----	17.0	0.80	4.7	18	410,000	5.5	2.5	4.0	49,454	4,121
Jan. 6	Jan. 21	4	35.7	27.9	7.8	10.0	7.5	2.7	16.0	0.23	5.3	21	460,000	5.2	3.1	3.6	49,454	4,121
Feb. 3	Feb. 26	6	44.0	35.7	8.3	10.0	8.8	1.2	15.0	0.16	4.0	25	650,000	4.8	2.5	3.7	49,454	4,121
Feb. 29	Mar. 5	2	48.5	38.5	10.0	12.0	9.5	2.5	16.0	0.20	2.5	25	810,000	3.5	3.1	3.2	49,454	4,121
May 25	May 26	1	91.0	71.0	20.0	14.0	9.0	5.0	13.0	0.50	1.0	66	----------	-----	-----	-----	49,454	4,121
July 13	Aug. 8	2	67.0	49.0	18.0	8.0	5.0	3.0	12.0	1.50	5.0	17	450,000	5.6	4.4	5.1	49,454	4,121
Sept. 7	Oct. 3	2	32.5	27.0	5.5	7.5	6.0	1.5	15.0	0.30	4.5	17	440,000	5.6	4.8	5.2	49,454	4,121

TABLE No. 26.

SETTLED EFFLUENT FROM TWELVE-FOOT SPRINKLING FILTER 4″ TO 6″ STONE

Sept. 20	Oct. 3	6	20.9	14.9	6.0	13.0	12.0	1.0	16.0	0.63	3.1	14	1,200,000	4.0	2.9	3.6	-------	-------
Oct. 6	Nov. 4	6	49.7	32.0	17.7	11.0	----	----	22.0	0.55	3.3	23	390,000	5.1	1.4	3.2	-------	-------
Nov. 15	Nov. 29	3	63.3	40.7	22.6	15.0	----	----	24.0	0.53	3.3	25	620,000	5.3	2.0	4.1	-------	-------
Dec. 11	Dec. 16	3	33.3	24.7	8.6	13.0	----	----	18.0	0.47	5.7	18	260,000	5.5	2.5	4.0	-------	-------
Jan. 6	Jan. 21	4	30.9	24.9	6.0	7.8	5.5	2.3	17.0	0.20	5.3	21	530,000	5.2	3.1	3.6	-------	-------
Feb. 3	Feb. 26	6	24.8	20.5	4.3	9.3	7.5	1.8	16.0	0.19	4.2	25	310,000	4.8	2.5	3.7	-------	-------
Feb. 29	Mar. 5	2	21.3	17.0	4.3	8.5	8.5	0.0	17.0	0.15	2.5	24	360,000	3.5	3.1	3.2	-------	-------
May 25	May 26	1	46.0	43.0	3.0	15.0	12.0	3.0	12.0	0.40	1.0	60	----------	-----	-----	-----	-------	-------
July 13	Aug. 8	2	41.5	24.0	17.0	5.5	5.0	0.5	12.0	1.30	6.5	16	310,000	5.6	4.4	5.1	-------	-------
Sept. 7	Oct. 3	2	26.0	23.5	2.5	7.5	5.5	2.0	15.0	0.30	7.5	18	270,000	5.6	4.8	5.2	-------	-------

TABLE No. 27.

Period Covered 1908		Number of Samples	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day			Population	
			Susp'd Solids			Nitrogen as						Oxygen Consumed						
						Organic			Free Ammonia	Nitrites	Nitrates							
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.						Maximum	Minimum	Average	Per Acre	Per Acre Foot
Effluent from Ten and One-half Foot Sprinkling Filter ½″ to 1½″ Stone																		
June 8	July 11	3	31.7	22.0	9.7	5.8	5.5	0.3	3.8	0.33	18.0	16	160,000	5.5	4.3	4.9	49,454	4,710
Aug. 10	Sept. 5	2	30.0	22.0	8.0	5.5	4.3	1.2	3.5	0.25	13.0	11	250,000	5.1	4.7	4.9	49,454	4,710
Oct. 5	Oct. 17	1	8.0	2.0	6.0	5.0	4.0	1.0	13.0	0.60	10.0	12	390,000	5.8	4.6	5.1	49,454	4,710

TABLE No. 28.

Settled Effluent from Ten and One-half Foot Sprinkling Filter ½″ to 1½″ Stone																		
June 8	July 11	3	26.7	16.3	10.4	6.2	5.5	0.7	3.8	0.23	20.0	15	6,400	5.5	4.3	4.9	-------	-------
Aug. 10	Sept. 5	2	24.0	18.0	6.0	5.0	4.5	0.5	3.5	0.30	13.0	12	4,600	5.1	4.7	4.9	-------	-------
Oct. 5	Oct. 17	1	9.0	2.0	7.0	6.0	4.0	2.0	13.0	0.30	10.0	14	110,000	5.8	4.6	5.1	-------	-------

TABLE No. 29.

Effluent from Four and One-half Foot Sprinkling Filter 1″ to 2″ Stone																		
June 8	July 11	3	41.3	34.7	6.6	10.0	8.3	1.7	13.0	0.37	3.7	26	320,000	5.5	4.3	4.9	49,454	10,990
Aug. 10	Sept. 5	2	64.5	47.0	17.5	7.5	5.0	2.5	15.0	0.30	4.0	25	410,000	5.1	4.7	4.9	49,454	10,990
Oct. 5	Oct. 17	1	13.0	10.0	3.0	5.0	4.0	1.0	23.0	0.10	1.0	32	1,100,000	5.8	4.6	5.1	49,454	10,990

TABLE No. 30.

Settled Effluent from Four and One-half Foot Sprinkling Filter 1″ to 2″ Stone																		
June 8	July 11	3	19.7	15.3	4.4	8.7	8.0	0.7	13.0	0.37	4.2	16	230,000	5.5	4.3	4.9	-------	-------
Aug. 10	Sept. 5	2	25.0	20.5	4.5	6.0	5.0	1.0	15.0	0.35	4.0	15	280,000	5.1	4.7	4.9	-------	-------
Oct. 5	Oct. 17	1	11.0	10.0	1.0	5.0	5.0	0.0	22.0	0.10	1.0	28	990,000	5.8	4.6	5.1	-------	-------

TABLE No. 31.

Effluent from Seven and One-half Foot Sprinkling Filter 1″ to 2″ Stone																		
June 8	July 11	3	36.7	28.7	8.0	8.7	8.0	0.7	9.7	0.63	12.0	16	180,000	5.5	4.3	4.9	49,454	6,594
Aug. 10	Sept. 5	2	44.5	33.0	11.5	8.7	6.7	2.0	8.3	0.60	14.0	16	290,000	5.1	4.7	4.9	49,454	6,594
Oct. 5	Oct. 17	1	9.0	5.0	4.0	4.0	3.0	1.0	18.0	0.30	4.0	15	620,000	5.8	4.6	5.1	49,454	6,594

TABLE No. 32.

Settled Effluent from Seven and One-half Foot Sprinkling Filter 1″ to 2″ Stone																		
June 8	July 11	3	27.0	20.3	6.7	7.5	6.5	1.0	9.2	0.67	11.0	16	140,000	5.5	4.3	4.9	-------	-------
Aug. 10	Sept. 5	2	31.0	21.5	9.5	7.7	5.7	2.0	7.7	0.55	7.5	16	220,000	5.1	4.7	4.9	-------	-------
Oct. 5	Oct. 17	1	6.0	4.0	2.0	6.0	5.0	1.0	19.0	0.20	4.0	28	610,000	5.8	4.6	5.1	-------	-------

TABLE No. 33.

Period Covered 1908		Number of Samples	Parts per Million										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day			Population	
			Susp'd Solids			Nitrogen as						Oxygen Consumed						
						Organic												
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates			Maximum	Minimum	Average	Per Acre	Per Acre Foot
Effluent from Ten and One-half Foot Sprinkling Filter 1″ to 2″ Stone																		
June 8	July 11	3	24.7	19.7	5.0	7.0	5.7	1.3	5.3	0.57	20.0	16	160,000	5.5	4.3	4.9	49,454	4,710
Aug. 10	Sept. 5	2	50.5	34.5	16.0	9.0	6.3	2.7	4.3	0.40	18.0	16	340,000	5.1	4.7	4.9	49,454	4,710
Oct. 5	Oct. 17	1	13.0	7.0	6.0	4.0	2.0	2.0	17.0	1.00	7.0	20	440,000	5.8	4.6	5.1	49,454	4,710

TABLE No. 34.

Settled Effluent from Ten and One-half Foot Sprinkling Filter 1″ to 2″ Stone

June 8	July 11	3	26.0	18.0	8.0	5.7	5.0	0.7	5.3	0.53	20.0	12	170,000	5.5	4.3	4.9	-------	-------
Aug. 10	Sept. 5	2	32.0	20.0	12.0	7.3	4.7	2.6	4.3	0.40	16.0	12	250,000	5.1	4.7	4.9	-------	-------
Oct. 5	Oct. 17	1	11.0	3.0	8.0	3.0	3.0	0.0	17.0	0.80	7.0	14	360,000	5.8	4.6	5.1	-------	-------

TABLE No. 35.

Effluent from Four and One-half Foot Sprinkling Filter 1″ to 3″ Stone

June 8	July 11	3	36.3	28.7	7.6	11.0	9.0	2.0	14.0	0.30	1.2	27	600,000	5.5	4.3	4.9	49,454	10,990
Aug. 10	Sept. 5	2	38.5	28.0	10.5	6.5	5.0	1.5	15.0	0.45	4.0	20	610,000	5.1	4.7	4.9	49,454	10,990
Oct. 5	Oct. 17	1	19.0	13.0	6.0	4.0	3.0	1.0	22.0	0.00	1.0	31	1,130,000	5.8	4.6	5.1	49,454	10,990

TABLE No. 36.

Settled Effluent from Four and One-half Foot Sprinkling Filter 1″ to 3″ Stone

June 8	July 11	3	24.7	22.7	2.0	10.0	9.3	0.7	14.0	0.27	0.7	24	62,000	5.5	4.3	4.9	-------	-------
Aug. 10	Sept. 5	2	30.0	23.0	7.0	5.5	4.5	1.0	15.0	0.40	3.5	18	10,200	5.1	4.7	4.9	-------	-------
Oct. 5	Oct. 17	1	17.0	11.0	6.0	7.0	4.0	3.0	21.0	0.00	1.0	34	150,000	5.8	4.6	5.1	-------	-------

TABLE No. 37.

Effluent from Six-foot Sprinkling Filter 1″ to 3″ Stone

July 13	Aug. 8	2	40.5	28.0	12.5	6.5	4.5	2.0	11.0	0.90	5.5	19	420,000	5.6	4.4	5.1	49,454	8,242
Sept. 7	Oct. 3	2	35.0	28.5	6.5	8.0	6.0	2.0	15.0	0.30	5.0	25	300,000	5.6	4.8	5.2	49,454	8,242

TABLE No. 38.

Settled Effluent from Six-foot Sprinkling Filter 1″ to 3″ Stone

July 13	Aug. 8	2	24.0	20.5	3.5	7.0	4.5	2.5	11.0	1.10	5.0	14	58,000	5.6	4.4	5.1	-------	-------
Sept. 7	Oct. 3	2	26.0	23.0	3.0	6.5	5.5	1.0	16.0	0.15	4.5	22	29,000	5.6	4.8	5.2	-------	-------

TABLE No. 39.

PERIOD COVERED 1908		NUMBER OF SAMPLES	PARTS PER MILLION										Bacteria per C. C.	Rate of Filtration Million Gallons per Acre per Day			POPULATION	
			SUSP'D SOLIDS			NITROGEN AS						Oxygen Consumed						
						ORGANIC												
From	To		Total	Loss on Ignition	Fixed	Total	Dissol'd	Susp.	Free Ammonia	Nitrites	Nitrates			Maximum	Minimum	Average	Per Acre	Per Acre Foot
EFFLUENT FROM SEVEN AND ONE-HALF FOOT SPRINKLING FILTER 1″ TO 3″ STONE																		
June 8	July 11	3	17.3	15.3	2.0	10.3	8.7	1.6	13.0	0.73	2.8	19	390,000	5.5	4.3	4.9	49,454	6,594
Aug. 10	Sept. 5	2	42.0	30.5	11.5	6.3	4.7	1.6	11.0	0.90	6.0	15	350,000	5.1	4.7	4.9	49,454	6,594
Oct. 5	Oct. 17	1	13.0	4.0	9.0	6.0	5.0	1.0	19.0	0.50	2.0	20	1,000,000	5.8	4.6	5.1	49,454	6,594

TABLE No. 40.

SETTLED EFFLUENT FROM SEVEN AND ONE-HALF FOOT SPRINKLING FILTER 1″ TO 3″ STONE

June 8	July 11	3	22.0	17.7	4.3	9.7	8.3	1.4	14.0	0.63	1.7	20	29,000	5.5	4.3	4.9	-------	-------
Aug. 10	Sept. 5	2	32.5	25.0	7.5	6.2	5.3	0.9	11.0	1.70	6.5	15	10,000	5.1	4.7	4.9	-------	-------
Oct. 5	Oct. 17	1	15.0	5.0	10.0	6.0	5.0	1.0	19.0	0.40	2.0	22	210,000	5.8	4.6	5.1	-------	-------

TABLE No. 41.

EFFLUENT FROM NINE-FOOT SPRINKLING FILTER 1″ TO 3″ STONE

July 13	Aug. 8	2	30.0	22.5	7.5	4.5	3.0	1.5	8.5	1.30	7.5	10	340,000	5.6	4.4	5.1	49,454	5,495
Sept. 7	Oct. 3	2	37.5	29.5	8.0	7.5	6.0	1.5	11.0	0.45	15.0	16	500,000	5.6	4.8	5.2	49,454	5,495

TABLE No. 42.

SETTLED EFFLUENT FROM NINE-FOOT SPRINKLING FILTER 1″ TO 3″ STONE

July 13	Aug. 8	2	18.5	13.0	5.5	4.0	3.5	0.5	8.5	1.40	8.5	13	45,000	5.6	4.4	5.1	-------	-------
Sept. 7	Oct. 3	2	22.5	20.0	2.5	6.5	5.5	1.0	11.0	0.60	15.0	17	41,000	5.6	4.8	5.2	-------	-------

APPENDIX II

Incubation Tests

TABLES 1 TO 7

TABLE No. 1.

STUDIES OF AVAILABLE OXYGEN IN METHYLENE BLUE INCUBATION TESTS.

Date		½" to 1½" Stone						1" to 2" Stone						2" to 4" Stone						4" to 6" Stone					
		Dissolved Oxygen Initial	Nitrites Initial	Nitrites Final	Nitrates Initial	Nitrates Final	Incubation 37° C, No. Hours Blue Retained	Dissolved Oxygen Initial	Nitrites Initial	Nitrites Final	Nitrates Initial	Nitrates Final	Incubation 37° C, No. Hours Blue Retained	Dissolved Oxygen Initial	Nitrites Initial	Nitrites Final	Nitrates Initial	Nitrates Final	Incubation 37° C, No. Hours Blue Retained	Dissolved Oxygen Initial	Nitrites Initial	Nitrites Final	Nitrates Initial	Nitrates Final	Incubation 37° C, No. Hours Blue Retained
		Tests of Effluents From Six-foot Sprinkling Filters																							
1907.																									
October	9	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.6	0.00	0.00	0.0	0.0	15	5.1	0.00	0.00	0.0	0.0	15
"	10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	2.0	0.00	0.00	0.0	0.0	18	6.0	0.00	0.00	0.0	0.0	0.5
"	11	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	6.1	0.00	0.00	0.0	0.0	20	4.5	0.00	0.00	0.0	0.0	15
"	21	4.1	0.00	0.00	0.0	0.0	23	5.6	0.00	0.00	0.0	0.0	10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	24	4.1	0.00	0.00	0.0	0.0	17	3.8	0.00	0.00	0.0	0.0	17	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	25	5.5	0.20	0.00	0.0	0.0	25	3.9	0.10	0.00	0.0	0.0	11	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	28	6.3	-----	0.00	-----	0.0	20	4.2	-----	0.00	-----	0.0	15	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	29	4.7	0.00	0.00	0.0	0.0	15	4.0	0.40	0.00	0.0	0.0	10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	30	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	9.0	0.00	0.00	0.0	0.0	14	4.4	0.00	0.00	0.0	0.0	14
"	31	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.8	0.00	0.00	0.0	0.0	8	3.1	0.00	0.00	0.0	0.0	8
November	1	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	5.5	0.00	0.00	0.0	0.0	14	2.6	0.00	0.00	0.0	0.0	11
"	7	6.8	0.20	0.00	0.0	0.0	25	6.9	0.40	0.00	0.0	0.0	22	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	8	6.2	0.00	0.00	0.0	0.0	40	3.4	0.20	0.00	0.0	0.0	43	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	9	7.5	0.10	0.04	0.0	0.4	50*	7.8	0.20	0.02	0.0	0.0	50*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	11	5.1	0.00	0.00	0.0	0.0	12	5.5	0.00	0.00	0.0	0.0	11	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	12	1.1	0.00	0.00	1.0	0.0	14	5.7	0.00	0.00	0.5	0.0	21	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	13	6.3	0.00	0.00	1.0	0.0	72*	5.8	0.40	0.02	1.0	0.0	20	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	21	5.4	0.80	0.00	0.0	0.0	90*	6.4	0.60	0.05	0.0	0.0	20	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	22	6.1	0.00	0.00	0.0	0.0	72	4.5	0.40	0.00	0.0	0.0	26	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	23	4.9	0.60	0.24	10.0	1.0	45*	5.1	0.40	0.64	8.0	1.0	45*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	25	5.8	0.10	0.00	0.0	0.0	21	4.6	0.40	0.10	0.0	0.0	21	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	26	6.1	2.00	0.00	1.0	0.0	30	6.0	0.00	0.00	0.0	0.0	24	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	27	6.8	0.60	0.00	1.0	3.0	51*	4.1	0.80	0.00	4.0	0.0	20	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	29	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.8	0.40	0.00	2.0	0.0	20	5.0	0.40	0.00	1.0	0.0	9
"	30	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	7.0	0.20	0.02	5.0	0.0	52	6.3	0.10	0.02	1.0	0.0	30
December	3	5.2	0.00	0.05	0.0	0.0	28	4.4	0.10	0.01	0.0	0.0	18	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	4	6.0	0.10	0.20	3.0	2.0	51*	6.2	1.00	0.45	3.0	1.0	51*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	5	6.8	2.40	1.00	8.0	4.0	46*	6.4	0.10	0.00	5.0	0.0	46*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	6	7.4	0.20	0.05	1.0	2.0	70*	5.9	2.40	0.15	0.0	0.0	70*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	7	7.2	0.20	0.05	2.0	8.0	48*	6.7	0.10	0.00	1.0	1.0	48*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	9	6.9	0.50	0.00	10.0	1.0	96	4.8	0.25	0.02	4.0	0.0	18	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	10	5.7	0.20	0.00	6.0	2.0	96*	5.8	0.70	0.00	4.0	0.0	96*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	11	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.20	0.00	0.0	0.0	16	-----	0.00	0.00	0.0	0.0	10
"	12	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	5.0	0.20	0.02	0.0	0.0	17	3.9	0.00	0.00	0.0	0.0	12
"	13	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.7	1.50	0.00	1.0	0.0	18	3.0	0.00	0.00	0.0	0.0	10
"	16	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.5	1.40	-----	2.0	-----	24	5.8	0.00	0.00	0.0	0.0	9
"	17	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	6.6	0.10	0.02	2.0	0.0	24	5.5	0.10	0.02	2.0	0.0	17
"	18	7.8	1.60	0.00	3.0	0.0	96*	5.9	0.90	0.00	3.0	0.0	20	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	19	7.0	2.00	0.02	5.0	1.0	96*	7.1	3.00	0.00	8.0	0.0	96*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	20	-----	0.10	0.00	5.0	2.0	96*	7.1	0.10	0.00	12.0	0.0	96*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	21	6.1	0.20	0.00	5.0	8.0	96*	7.0	0.50	0.00	8.0	4.0	96*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	23	4.4	0.00	0.32	6.0	15.0	36*	5.5	0.00	0.45	12.0	15.0	96*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	24	7.8	0.40	0.00	5.0	5.0	96*	7.8	0.40	0.00	8.0	4.0	96*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	26	4.7	0.80	0.00	5.0	0.0	96*	6.4	0.60	0.00	5.0	0.0	96*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	27	4.2	1.20	0.00	0.0	0.0	96	6.6	1.30	0.00	0.0	0.0	42	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	28	5.0	0.00	0.05	3.0	1.0	96*	5.5	0.20	0.10	5.0	0.0	96*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	30	4.4	0.00	0.00	6.0	0.0	96*	6.6	0.10	0.02	5.0	0.0	96*	3.0	0.00	0.00	0.0	0.0	44	2.0	0.00	0.00	0.0	0.2	8
1908.																									
January	2	2.6	0.00	0.00	20.0	0.0	19	4.5	0.80	0.00	20.0	0.0	16	5.8	0.40	0.00	5.0	0.0	24	4.5	0.80	0.01	1.0	0.0	9
"	3	3.2	0.40	0.10	5.0	0.0	49	5.7	1.00	0.10	7.0	0.0	25	6.2	0.40	0.10	1.0	0.0	31	4.4	0.30	0.00	0.0	0.0	9
"	6	4.2	0.00	0.05	0.0	0.0	22	4.9	3.50	0.00	7.0	0.0	22	7.0	0.20	0.05	0.0	0.0	29	6.1	0.10	0.05	0.0	0.0	14
"	7	-----	0.40	0.15	7.0	0.0	79	-----	0.30	0.10	8.0	0.0	41	-----	0.20	0.00	3.0	0.0	26	-----	0.20	0.05	1.0	1.0	12
"	8	5.6	0.40	0.05	5.0	0.0	37	5.9	0.00	0.00	5.0	0.0	23	3.9	0.80	0.00	1.0	0.0	74	4.2	0.40	0.10	0.0	0.0	15
"	9	6.0	1.00	0.00	5.0	0.0	24	5.4	0.60	0.00	7.0	0.0	22	6.9	1.00	0.10	7.0	2.0	96*	5.2	0.40	0.00	0.0	0.0	23
"	10	-----	0.40	0.15	5.0	0.0	96*	-----	2.00	0.10	3.0	0.0	30	7.4	0.60	0.00	1.0	0.0	96*	5.2	0.00	0.02	0.0	0.0	13
"	11	-----	0.20	0.30	5.0	1.0	96*	-----	0.00	0.00	2.0	0.0	96*	-----	0.40	0.02	2.0	0.0	96*	-----	0.30	0.02	1.0	0.0	27
"	13	-----	2.00	0.05	2.0	0.0	17	-----	1.20	0.00	3.0	0.0	17	-----	0.00	0.00	1.0	0.0	19	-----	0.10	0.05	0.0	0.0	10
"	14	4.8	0.40	0.00	5.0	0.0	21	6.0	1.20	0.00	5.0	0.0	21	5.2	0.40	0.00	3.0	0.0	24	4.6	0.00	0.05	1.0	0.0	10
"	15	5.0	2.20	0.05	5.0	0.0	26	5.1	0.80	0.00	5.0	0.0	24	5.2	0.00	0.00	1.0	0.0	30	4.3	0.10	0.00	0.0	0.0	10
"	16	4.7	0.20	0.00	2.0	0.0	61	5.9	0.00	0.00	5.0	0.0	62	4.6	1.00	0.00	1.0	0.0	56	4.1	0.10	0.05	0.0	0.0	8
"	17	5.5	0.40	0.00	8.0	0.0	54	5.6	0.40	0.00	5.0	0.0	47	5.5	0.20	0.00	3.0	0.0	47	3.8	0.20	0.03	0.0	0.0	12
"	18	6.7	0.40	0.00	10.0	1.0	96*	7.2	0.40	0.80	9.0	1.0	96*	5.7	0.00	0.15	3.0	0.0	96*	5.2	0.40	0.75	1.0	1.0	27
"	20	5.0	2.20	0.05	6.0	0.0	34	7.4	1.80	0.10	3.0	0.0	22	4.7	0.00	0.15	0.0	0.0	20	2.9	0.60	0.10	0.0	0.0	9
"	21	5.9	3.20	0.05	7.0	0.0	56	4.8	0.40	0.00	3.0	0.0	24	2.7	1.20	0.05	0.0	0.0	31	2.2	0.20	0.10	0.0	0.0	8
"	24	5.9	0.80	0.05	2.0	0.0	96*	6.6	1.60	0.05	1.0	0.0	29	5.7	0.10	0.10	0.0	0.0	29	6.2	0.40	0.10	0.0	0.0	7
"	25	3.0	1.40	0.00	3.0	0.0	46	7.4	0.10	0.00	0.0	0.0	25	7.4	0.20	0.05	0.0	0.0	22	5.0	0.80	0.10	5.0	0.0	17
"	27	5.3	3.00	0.00	10.0	0.0	61	6.2	1.20	0.00	7.0	0.0	32	5.0	0.30	0.05	0.0	0.0	22	5.9	0.30	0.05	0.0	0.0	8
"	28	6.7	0.20	0.00	1.0	0.0	24	5.8	0.30	0.00	0.0	0.0	24	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	29	7.6	0.20	0.75	10.0	1.0	96*	5.6	0.02	0.05	10.0	0.0	60	5.9	0.20	0.02	2.0	0.0	96*	5.8	0.10	0.00	0.0	0.0	12
"	30	5.7	0.10	0.05	12.0	7.0	96*	5.4	0.10	0.00	5.0	0.0	96*	6.3	0.00	0.10	1.0	0.0	32	4.0	0.00	0.05	0.0	0.0	23
"	31	5.4	1.00	0.00	10.0	0.0	96*	5.6	0.00	0.00	0.0	0.0	35	5.0	0.80	0.02	0.0	0.0	44	5.6	0.10	0.05	0.0	0.0	14
February	1	6.4	0.20	0.00	5.0	0.0	96*	6.3	0.40	0.00	1.0	0.0	96*	6.1	0.00	0.00	0.0	0.0	52	6.1	0.00	0.00	0.0	0.0	45
"	3	6.7	0.20	0.00	8.0	0.0	96*	7.0	0.10	0.00	5.0	0.0	44	6.0	0.10	0.00	3.0	0.0	96*	7.1	0.10	0.00	1.0	0.0	37
"	4	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	6.4	0.20	0.00	0.0	0.0	26	6.8	0.20	0.00	0.0	0.0	10
"	5	6.0	0.40	0.00	10.0	0.0	96*	6.2	0.20	0.00	7.0	0.0	-----	4.7	0.10	0.00	0.0	0.0	11	4.9	0.00	0.03	0.0	0.0	11
"	6	7.4	1.40	-----	9.0	-----	72	1.8	0.10	0.00	6.0	0.0	37	5.7	0.10	0.00	0.0	0.0	24	6.6	0.20	0.10	0.0	0.0	12
"	7	7.0	1.00	0.00	7.0	0.0	96*	5.4	0.10	0.00	7.0	0.0	41	6.2	0.20	0.00	1.0	0.0	18	6.0	0.00	0.00	0.0	0.0	11
"	8	8.4	0.20	0.00	7.0	1.0	96*	8.1	0.20	0.00	7.0	1.0	96*	7.5	0.00	0.00	5.0	0.0	85	6.4	0.00	-----	1.0	-----	29
"	10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	4.8	0.00	0.02	0.0	0.0	11	4.5	0.10	0.02	0.0	0.0	9
"	11	5.7	0.80	0.00	5.0	0.0	96*	6.5	1.00	0.05	1.0	0.0	50	5.1	0.00	0.00	0.0	0.0	10	5.2	0.00	0.00	0.0	0.0	8
"	12	6.0	0.70	0.00	5.0	0.0	40	6.3	1.40	0.05	0.0	0.0	38	4.1	0.10	0.05	0.0	0.0	22	4.4	0.10	0.03	0.0	0.0	8
"	13	6.1	0.00	0.20	0.0	3.0	96*	6.1	0.20	0.00	3.0	0.0	96*	5.2	0.20	0.00	1.0	0.0	36	2.4	0.00	0.00	0.0	0.0	28
"	14	5.2	0.20	0.05	10.0	0.0	96*	5.1	0.20	0.00	5.0	0.0	96*	4.7	0.00	0.02	0.0	0.0	31	4.7	0.00	-----	0.0	-----	-----
"	17	5.2	2.00	0.00	8.0	0.0	60	5.0	1.80	0.00	1.0	0.0	55	4.0	0.20	0.00	0.0	0.0	21	4.4	0.10	0.00	0.0	0.0	19
"	18	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	5.2	0.00	0.00	0.0	0.0	30	5.4	0.00	0.00	0.0	0.0	15
"	19	14.4	0.10	0.00	7.0	0.0	96*	6.5	0.00	0.02	3.0	0.0	46	6.2	0.80	0.00	1.0	0.0	26	5.7	0.80	0.00	0.0	0.0	17
"	20	7.2	0.10	0.10	10.0	0.0	96*	5.7	0.80	0.05	7.0	0.0	48	5.1	1.20	0.00	2.0	0.0	36	5.5	0.00	0.00	0.0	0.0	16
"	21	7.1	0.40	0.15	7.0	0.0	96*	7.2	0.40	0.20	7.0	10.0	96*	6.7	0.20	0.05	0.0	0.0	36	5.1	0.20	0.03	0.0	0.0	25
"	24	1.3	2.00	0.00	7.0	0.0	25	6.0	0.20	0.00	7.0	0.0	25	1.4	1.20	0.00	1.0	0.0	34	4.3	0.00	-----	0.0	0.0	33
"	25	4.5	1.00	0.00	5.0	0.0	21	5.0	0.80	0.20	5.0	1.0	26	4.0	0.10	0.00	0.0	0.0	26	5.0	0.10	0.00	0.0	0.0	9
"	26	5.8	0.00	0.04	8.0	6.0	96*	6.4	0.60	0.10	8.0	0.0	96*	7.1	0.80	0.00	5.0	0.0	96*	7.7	0.80	0.01	1.0	0.0	46
"	27	7.5	1.40	0.00	8.0	3.0	96*	5.3	1.40	0.02	7.0	0.0	96*	5.4	2.20	0.35	1.0	0.0	35	5.2	0.40	0.20	0.0	0.0	16
"	28	8.0	0.20	0.50	10.0	7.0	96*	9.0	0.20	0.08	5.0	0.0	96*	6.8	1.00	0.00	5.0	0.0	96*	7.5	0.04	0.01	1.0	0.0	16
"	29	8.5	0.04	0.01	7.0	2.0	96*	8.8	0.00	0.01	5.0	0.0	96*	6.2	0.10	0.00	3.0	0.0	15	6.1	0.06	0.00	1.0	0.0	20
March	2	6.8	0.00	0.00	10.0	0.0	96*	6.2	0.00	0.00	7.0	0.0	44	4.2	0.00	0.00	0.0	0.0	24	4.0	0.01	0.00	1.0	0.0	10
"	3	6.4	0.20	0.00	10.0	0.0	96	6.5	0.20	0.00	7.0	0.0	44	4.0	0.00	0.00	0.0	0.0	15	4.5	0.00	0.00	0.0	0.0	10
"	4	5.5	0.00	-----	0.0	0.0	20	6.7	0.40	0.00	8.0	0.0	35	4.4	0.70	-----	1.0	0.0	20	4.4	0.00	0.00	0.0	0.0	11
"	5	7.4	1.60	0.00	10.0	5.0	96*	6.5	0.00	0.00	10.0	0.0	96*	5.0	0.40	0.00	0.0	0.0	31	4.8	0.20	0.06	0.0	0.0	19
"	6	5.8	1.00	0.10	5.0	3.0	-----	5.7	0.01	0.00	1.0	0.0	-----	6.1	0.00	0.00	0.0	0.0	40	4.5	0.00	0.00	0.0	0.0	35
"	7	7.2	0.25	0.00	4.0	4.0	96*	6.2	0.10	0.00	3.0	1.0	96*	5.4	0.00	0.00	0.0	0.0	75	5.7	0.00	0.00	0.0	0.0	11
"	9	5.6	-----	-----	1.0	0.0	37	6.0	1.20	0.00	-----	-----	37	4.4	-----	-----	-----	-----	-----	4.2	-----	-----	-----	-----	-----
"	10	5.1	0.20	0.00	5.0	1.0	96*	6.2	0.20	0.00	5.0	0.0	96*	5.6	0.20	0.00	3.0	0.0	41	-----	-----	-----	-----	-----	-----
"	11	6.3	0.05	0.10	10.0	0.0	96*	6.2	0.20	0.05	8.0	0.0	96*	4.9	0.25	0.00	3.0	0.0	29	4.3	0.25	0.00	0.0	0.0	12
"	12	5.7	0.50	0.01	7.0	0.0	96*	6.9	0.25	0.00	6.0	0.0	96*	4.1	0.00	0.00	3.0	0.0	59	-----	-----	-----	-----	-----	-----
"	13	7.0	0.20	0.10	5.0	5.0	96*	7.3	0.20	0.01	7.0	1.0	96*	5.4	0.20	0.01	3.0	0.0	62	-----	-----	-----	-----	-----	-----
"	14	6.8	0.05	0.05	5.0	1.0	96*	7.4	0.01	0.00	8.0	1.0	96*	5.2	0.01	0.01	0.0	0.0	42	-----	-----	-----	-----	-----	-----
"	16	4.8	0.12	0.00	3.0	0.0	20	4.6	0.20	0.00	7.0	0.0	16	4.8	0.20	0.00	0.0	0.0	12	-----	-----	-----	-----	-----	-----
"	17	5.2	1.00	0.02	5.0	0.0	27	7.7	0.80	0.00	10.0	1.0	96*	9.0	0.00	0.00	0.0	0.0	15	-----	-----	-----	-----	-----	-----
"	18	5.6	0.20	0.00	5.0	1.0	96*	6.4	0.15	0.00	7.0	1.0	72	4.4	0.25	0.00	3.0	0.0	20	3.3	0.20	0.00	0.0	0.0	9
"	19	6.1	0.10	1.00	8.0	3.0	96*	6.7	0.20	0.00	7.0	2.0	96*	2.5	0.20	0.25	0.0	2.0	28	-----	-----	-----	-----	-----	-----
"	20	10.0	0.50	0.00	12.0	4.0	96*	7.2	0.00	0.00	7.0	0.5	-----	5.6	0.00	0.00	1.0	1.0	36	-----	-----	-----	-----	-----	-----
"	21	5.9	0.00	0.05	7.0	1.0	96*	5.5	0.00	0.00	6.0	0.0	96*	4.4	0.00	0.00	1.0	1.0	16	-----	-----	-----	-----	-----	-----
"	23	-----	0.30	0.00	1.0	0.0	-----	-----	0.10	0.00	10.0	1.0	22	-----	0.10	-----	3.0	0.5	-----	-----	-----	-----	-----	-----	-----
"	24	5.5	0.10	0.00	12.0	0.5	96*	4.8	0.20	0.00	7.0	1.0	35	3.8	0.20	0.00	2.0	1.0	35	-----	-----	-----	-----	-----	-----
"	25	3.8	0.15	-----	5.0	-----	-----	4.4	0.20	-----	3.0	-----	-----	5.0	0.15	0.00	0.5	1.0	13	2.5	0.10	0.00	0.5	0.5	10
"	26	5.9	0.20	0.10	7.0	2.0	96*	5.9	0.10	0.25	7.0	1.0	96*	4.4	0.20	0.00	2.0	0.5	25	3.9	0.20	-----	1.0	-----	-----
"	27	6.5	0.20	0.00	7.0	1.0	96*	5.4	0.25	0.00	6.0	0.5	96*	4.5	0.25	0.02	0.0	0.0	24	2.5	0.00	0.00	0.5	0.5	13
"	30	-----	0.00	0.00	10.0	0.5	37	-----	0.20	0.00	3.0	0.5	35	-----	0.25	0.00	0.5	0.5	17	-----	0.10	0.00	0.5	0.5	13
"	31	-----	0.05	0.00	8.0	2.0	96*	-----	0.10	0.00	3.0	0.5	96*	-----	0.10	0.05	1.0	0.5	23	-----	0.05	0.00	0.5	1.0	11
April	1	-----	0.15	0.02	0.0	1.0	9	-----	0.15	0.00	2.0	1.0	72	-----	0.15	0.04	1.0	1.0	28	-----	0.10	0.00	0.5	-----	-----
"	2	-----	0.15	0.00	10.0	1.0	96*	-----	0.20	0.00	4.0	0.5	96*	-----	0.15	0.00	0.5	1.0	-----	-----	0.10	0.00	1.0	1.0	9
"	3	-----	0.20	0.00	7.0	0.5	22	-----	0.80	0.00	2.0	0.5	96*	-----	0.20	0.00	0.5	2.0	19	-----	0.15	0.00	1.0	1.0	17
"	4	-----	0.00	0.00	5.0	2.0	96*	-----	0.00	0.00	4.0	2.0	96*	-----	0.20	0.25	1.0	0.0	17	-----	0.20	0.00	1.0	1.0	11
"	6	-----	0.10	0.00	10.0	0.0	52	-----	0.05	0.05	5.0	1.0	52	-----	0.10	0.0	2.0	1.0	-----	-----	0.10	0.00	0.5	1.0	7
"	7	-----	1.00	0.00	1.0	1.0	37	-----	0.80	0.00	2.0	0.5	22	-----	0.00	0.05	1.0	1.0	24	-----	0.10	0.00	1.0	1.0	7
"	8	-----	0.30	0.00	6.0	0.5	96*	-----	0.30	0.00	2.0	0.0	55	-----	0.00	0.00	1.0	0.5	23	-----	0.40	0.00	0.5	0.5	7
"	9	-----	0.80	0.00	6.0	0.0	40	-----	0.60	0.00	4.0	0.0	50	-----	0.10	0.10	0.5	0.0	15	-----	0.05	0.00	0.0	0.5	11
"	10	-----	0.10	0.00	10.0	0.0	96*	-----	0.40	0.00	8.0	0.5	65	-----	0.10	0.00	2.0	1.0	24	-----	0.20	0.00	1.0	0.0	15
"	11	-----	0.80	0.00	5.0	1.0	12	-----	1.50	0.00	4.0	2.0	12	-----	0.00	0.00	1.0	0.0	27	-----	0.00	0.00	0.5	0.5	11
"	13	-----	1.00	0.00	3.0	1.0	42	-----	0.60	0.00	2.0	1.0	35	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	14	-----	0.10	0.00	5.0	0.0	37	-----	0.10	0.00	7.0	0.5	37	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	15	-----	0.10	0.05	10.0	0.0	60	-----	0.10	0.00	10.0	0.0	64	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	16	-----	0.15	0.00	10.0	0.5	96*	-----	0.20	0.05	8.0	0.0	96*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	18	-----	0.15	0.00	1.0	1.0	61	-----	0.20	0.05	1.0	1.0	48	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	20	-----	0.25	0.00	1.0	0.5	64	-----	0.20	0.00	4.0	1.0	78	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	21	-----	0.00	0.00	1.0	0.5	54	-----	0.00	0.00	2.0	1.0	96*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	27	-----	1.00	0.00	2.0	1.0	44	-----	0.50	0.00	1.0	1.0	51	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	28	-----	0.15	0.00	3.0	0.5	47	-----	0.20	0.00	4.0	0.5	51	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	29	-----	0.10	0.00	5.0	0.5	62	-----	0.40	0.00	10.0	1.0	96*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	30	-----	0.00	0.00	8.0	0.5	62	-----	0.35	0.00	0.0	1.0	70	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
May	1	-----	0.10	0.05	4.0	10.0	96*	-----	0.15	1.50	7.0	2.0	96*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	2	-----	0.40	0.00	2.0	0.5	96*	-----	0.30	0.05	7.0	0.5	96*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	4	-----	0.30	0.00	3.0	0.5	96*	-----	0.40	0.05	12.0	3.0	96*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	5	-----	0.15	0.00	7.0	1.0	44	-----	0.40	0.08	8.0	0.0	56	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	6	-----	0.15	0.00	6.0	0.0	98	-----	0.40	0.00	10.0	1.0	96*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
"	8	-----	0.60	0.00	15.0	0.5	96*	-----	2.40	0.00	18.0	1.0	96*	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

*Indicates that sample was taken out of incubator before blue color disappeared.

TABLE No. 1.

STUDIES OF AVAILABLE OXYGEN IN METHYLENE BLUE INCUBATION TESTS.

Date		½″ to 1½″ Stone						1″ to 2″ Stone						2″ to 4″ Stone						1″ to 3″ Stone					
		Dissolved Oxygen Initial	Nitrites		Nitrates		Incubation 37° C. No. Hours Blue Retained	Dissolved Oxygen Initial	Nitrites		Nitrates		Incubation 37° C. No. Hours Blue Retained	Dissolved Oxygen Initial	Nitrites		Nitrates		Incubation 37° C. No. Hours Blue Retained	Dissolved Oxygen Initial	Nitrites		Nitrates		Incubation 37° C. No. Hours Blue Retained
			Initial	Final	Initial	Final			Initial	Final	Initial	Final			Initial	Final	Initial	Final			Initial	Final	Initial	Final	
Tests of Effluents From Nine-foot Sprinkling Filters.																									
1907.																									
October	9	—	—	—	—	—	—	—	—	—	—	—	—	[illegible]	1.40	0.00	1.0	0.0	22	5.6	0.00	0.00	0.0	0.0	15
"	10	—	—	—	—	—	—	—	—	—	—	—	—	[illegible]	0.00	0.00	0.0	0.0	26	2.0	0.00	0.00	0.0	0.0	15
"	11	—	—	—	—	—	—	—	—	—	—	—	—	[illegible]	1.00	0.00	2.0	0.0	40	4.9	0.00	0.00	0.0	0.0	19
"	23	6.5	0.70	0.00	0.0	0.0	22	4.6	0.00	0.00	0.0	0.0	19	—	—	—	—	—	—	—	—	—	—	—	—
"	24	8.6	0.00	0.00	0.0	0.0	30	5.1	0.00	0.00	0.0	0.0	22	—	—	—	—	—	—	—	—	—	—	—	—
"	25	7.4	0.60	0.00	0.0	0.0	70	4.2	1.80	0.00	0.0	0.0	10	—	—	—	—	—	—	—	—	—	—	—	—
"	28	7.0	—	0.00	—	0.0	25	6.6	—	0.00	—	0.0	25	—	—	—	—	—	—	—	—	—	—	—	—
"	29	6.8	0.70	0.00	0.0	0.0	46	5.4	0.40	0.00	0.0	0.0	31	—	—	—	—	—	—	—	—	—	—	—	—
"	30	—	—	—	—	—	—	—	—	—	—	—	—	7.5	0.00	0.00	0.0	0.0	14	5.2	0.10	0.00	0.0	0.0	14
"	31	—	—	—	—	—	—	—	—	—	—	—	—	5.5	0.10	0.00	0.0	0.0	15	6.8	0.00	0.00	0.0	0.0	9
November	1	—	—	—	—	—	—	—	—	—	—	—	—	4.4	0.00	0.00	0.0	0.0	25	4.4	0.00	0.00	0.0	0.0	14
"	7	7.5	0.20	0.00	0.0	0.0	22	6.8	0.40	0.00	0.0	0.0	22	—	—	—	—	—	—	—	—	—	—	—	—
"	8	7.50	1.00	0.00	0.0	0.0	72*	6.0	0.20	0.00	0.0	0.0	72*	—	—	—	—	—	—	—	—	—	—	—	—
"	9	6.6	1.20	0.20	0.0	4.0	70*	7.9	1.00	0.30	4.0	4.0	80*	—	—	—	—	—	—	—	—	—	—	—	—
"	11	6.8	1.10	0.00	0.0	0.0	31	6.6	0.60	0.40	0.0	0.0	22	—	—	—	—	—	—	—	—	—	—	—	—
"	12	6.1	2.00	0.00	4.0	0.0	21	5.6	1.00	0.40	5.0	0.0	40	—	—	—	—	—	—	—	—	—	—	—	—
"	13	6.7	0.20	0.70	2.0	1.0	72*	7.2	0.20	0.70	5.0	3.0	72*	—	—	—	—	—	—	—	—	—	—	—	—
"	14	7.3	0.20	0.10	0.0	4.0	90*	6.2	4.70	0.00	0.0	0.0	90*	—	—	—	—	—	—	—	—	—	—	—	—
"	22	7.0	0.20	0.00	1.0	5.0	85*	6.6	0.60	0.00	10.0	8.0	60*	—	—	—	—	—	—	—	—	—	—	—	—
"	23	5.1	2.00	0.20	10.0	5.0	45*	5.9	0.60	0.50	10.0	8.0	45*	—	—	—	—	—	—	—	—	—	—	—	—
"	25	6.0	3.40	0.00	0.0	0.0	28	7.0	4.00	4.40	8.0	8.0	26*	—	—	—	—	—	—	—	—	—	—	—	—
"	26	6.6	1.20	0.20	10.0	9.0	40	6.1	1.40	1.30	10.0	8.0	71*	—	—	—	—	—	—	—	—	—	—	—	—
"	27	6.5	0.40	0.40	8.0	6.0	51*	7.4	0.40	0.07	10.0	10.0	51*	—	—	—	—	—	—	—	—	—	—	—	—
"	28	—	—	—	—	—	—	—	—	—	—	—	—	5.7	0.50	0.00	5.0	0.0	28	4.5	0.30	0.00	1.0	0.0	14
"	29	—	—	—	—	—	—	—	—	—	—	—	—	6.2	0.20	0.01	4.0	0.0	75	5.2	0.70	0.00	1.0	0.0	44
December	2	6.4	2.40	0.00	10.0	0.0	40	6.2	0.20	0.01	0.0	0.0	18	—	—	—	—	—	—	—	—	—	—	—	—
"	4	7.5	1.00	0.90	10.0	10.0	51*	6.7	1.20	0.40	10.0	8.0	51*	—	—	—	—	—	—	—	—	—	—	—	—
"	5	8.2	2.40	0.10	20.0	20.0	46*	7.5	0.80	0.22	15.0	15.0	46*	—	—	—	—	—	—	—	—	—	—	—	—
"	6	6.2	1.20	0.10	10.0	15.0	70*	7.2	2.00	0.08	10.0	5.0	70*	—	—	—	—	—	—	—	—	—	—	—	—
"	7	7.0	3.00	0.10	10.0	10.0	45*	7.5	0.20	0.20	5.0	10.0	45*	—	—	—	—	—	—	—	—	—	—	—	—
"	9	7.7	0.60	0.20	20.0	10.0	96*	7.2	0.60	0.00	15.0	1.0	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	10	7.0	0.60	0.20	8.0	8.0	96*	6.4	0.30	0.00	12.0	0.0	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	11	—	—	—	—	—	—	—	—	—	—	—	—	—	2.40	0.00	3.0	0.0	19	—	0.00	0.00	0.0	0.0	12
"	12	—	—	—	—	—	—	—	—	—	—	—	—	6.0	1.20	0.00	3.0	0.0	28	4.9	0.10	0.00	0.0	0.0	18
"	13	—	—	—	—	—	—	—	—	—	—	—	—	4.0	1.20	0.00	5.0	0.0	96*	6.4	0.00	0.00	0.0	0.0	18
"	16	—	—	—	—	—	—	—	—	—	—	—	—	7.0	0.80	0.00	5.0	0.0	96*	4.7	1.00	0.00	1.0	0.0	22
"	17	—	—	—	—	—	—	—	—	—	—	—	—	7.5	0.20	0.00	5.0	0.0	96*	6.2	0.10	0.00	0.0	0.0	15
"	18	8.0	0.20	0.25	10.0	5.0	96*	6.9	2.40	0.10	0.0	0.0	15	—	—	—	—	—	—	—	—	—	—	—	—
"	19	8.4	1.40	0.45	10.0	5.0	96*	7.5	2.00	0.47	10.0	9.0	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	20	8.0	0.30	0.05	15.0	5.0	96*	8.3	0.10	0.05	12.0	10.0	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	21	8.2	0.20	0.00	10.0	8.0	96*	8.1	0.20	0.00	10.0	10.0	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	23	6.0	0.60	0.20	10.0	10.0	96*	7.0	0.60	0.40	15.0	15.0	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	24	9.1	0.00	0.00	8.0	8.0	96*	6.7	0.40	0.00	10.0	5.0	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	26	6.0	0.00	0.00	6.0	6.0	96*	6.6	1.40	0.40	10.0	10.0	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	27	6.8	1.00	0.00	6.0	1.0	96*	7.0	1.00	0.07	5.0	1.0	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	28	6.4	0.00	0.00	8.0	5.0	96*	6.6	0.30	0.20	8.0	1.0	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	30	3.2	0.30	0.05	10.0	7.0	96*	7.0	0.10	0.05	12.0	5.0	96*	4.4	0.00	0.00	0.0	0.0	31	5.2	0.00	0.00	0.0	0.0	15
1908.																									
January	2	3.0	0.40	0.00	—	0.0	24	3.0	0.60	0.00	—	0.0	19	7.0	0.80	0.00	10.0	0.0	25	6.0	0.30	0.00	2.0	0.0	18
"	3	7.0	0.60	1.00	10.0	8.0	96*	5.9	1.00	0.40	10.0	0.0	96*	7.4	0.60	0.00	7.0	0.0	96*	6.0	0.20	0.10	0.0	0.0	25
"	6	4.4	0.40	0.10	0.0	0.0	91	5.2	1.80	0.00	8.0	0.0	23	7.6	1.20	0.00	8.0	0.0	22	6.0	0.10	0.00	0.0	0.0	15
"	7	—	0.20	0.00	8.0	8.0	96*	—	0.40	0.20	8.0	3.0	96*	—	0.40	0.02	5.0	0.0	96*	—	0.30	0.00	1.0	0.0	22
"	8	4.6	0.40	0.10	7.0	0.0	96*	4.8	1.00	0.10	10.0	0.0	96*	6.6	0.80	0.30	5.0	0.0	96*	4.9	0.40	0.15	0.0	0.0	22
"	9	6.8	0.40	0.20	7.0	0.0	44	4.5	0.70	0.04	8.0	0.0	31	6.8	1.40	0.05	6.0	0.0	96*	5.4	0.00	0.00	1.0	0.0	16
"	10	—	0.40	0.60	7.0	0.0	96*	—	1.00	0.05	5.0	0.0	[illegible]	6.6	0.60	1.40	5.0	5.0	96*	7.1	0.20	0.05	0.0	0.0	25
"	11	—	0.00	1.30	8.0	5.0	96*	—	0.40	0.00	7.0	1.0	96*	—	0.40	0.00	6.0	5.0	30	—	0.40	0.00	1.0	0.0	96*
"	13	—	2.00	0.00	2.0	0.0	25	—	2.00	0.00	2.0	0.0	26	—	1.20	0.00	5.0	0.0	40	—	0.10	0.00	0.0	0.0	16
"	14	[illegible]	2.40	0.00	10.0	0.0	19	[illegible]	2.00	0.00	7.0	0.0	19	6.0	0.40	0.00	7.0	0.0	96	6.9	1.20	0.05	1.0	0.0	14
"	15	[illegible]	1.00	0.05	10.0	0.0	36	5.0	1.00	0.00	12.0	0.0	96*	6.2	0.00	0.00	6.0	0.0	96*	5.2	0.01	0.00	4.0	1.0	26
"	16	6.2	0.00	1.00	10.0	0.0	96*	6.0	0.00	4.10	10.0	8.0	96*	5.9	0.80	0.20	8.0	8.0	96*						
"	17	6.4	0.40	2.20	12.0	8.0	96*	6.2	0.40	0.14	12.0	8.0	96*	6.2	0.00	0.18	7.0	4.0	96*	5.5	0.40	0.00	2.0	0.0	22
"	18	6.0	0.40	0.20	10.0	8.0	96*	7.0	0.40	0.20	10.0	8.0	96*	6.6	0.60	0.50	10.0	2.0	96*	5.8	0.40	0.05	2.0	0.0	26
"	20	9.2	2.00	0.60	7.0	0.0	24	6.8	0.40	0.10	10.0	0.0	30	6.6	2.80	0.20	5.0	0.0	20	4.0	0.20	0.15	0.0	0.0	30
"	21	7.0	2.00	0.10	12.0	0.0	96*	5.2	1.00	0.10	9.0	12.0	96*	4.6	1.10	0.00	3.0	0.0	96*	5.7	0.40	0.05	0.0	1.0	19
"	22	6.6	1.00	0.80	8.0	1.0	96*	6.1	1.40	0.00	2.0	0.0	96*	6.0	0.07	0.00	0.0	0.0	83	6.6	0.40	0.05	0.0	0.0	12
"	23	6.1	4.40	0.00	10.0	0.0	96*	4.7	0.40	0.00	1.0	0.0	96*	4.7	0.20	0.00	0.0	0.0	96*	4.5	0.20	0.10	0.0	0.0	29
"	25	6.1	0.00	0.00	10.0	0.0	96*	5.1	0.80	0.40	10.0	0.0	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	28	6.0	0.40	2.40	6.0	1.0	96*	7.2	0.30	0.10	4.0	0.0	48	6.3	4.00	0.00	0.0	0.0	24*	6.2	0.00	0.05	0.0	0.0	8
"	29	7.5	0.20	0.40	15.0	12.0	96*	8.2	0.70	2.00	15.0	10.0	96*	7.1	0.20	0.03	7.0	9.0	96*	6.2	0.00	0.05	1.0	0.0	30
"	30	5.4	0.10	0.90	12.0	7.0	96*	8.8	0.40	0.20	12.0	5.0	96*	7.0	0.10	0.00	6.0	0.0	96*	9.1	0.10	—	1.0	—	30
"	31	9.6	0.60	2.40	25.0	12.0	96*	5.6	1.00	0.03	7.0	0.0	96*	7.4	0.80	0.00	1.0	0.0	96*	6.8	0.20	0.00	0.0	0.0	17
February	1	7.1	0.40	0.03	10.0	10.0	96*	7.1	0.10	0.05	7.0	1.0	96*	7.3	0.00	0.00	3.0	1.0	96*	7.1	0.00	0.00	0.0	0.0	41
"	3	7.0	0.10	1.40	15.0	8.0	96*	6.7	0.10	0.05	10.0	0.0	96*	6.8	0.10	0.20	12.0	5.0	96*	7.0	0.10	0.00	1.0	0.0	18
"	4	—	—	—	—	—	—	—	—	—	—	—	—	7.2	0.30	0.03	1.0	0.0	27	7.3	0.20	0.03	0.0	0.0	14
"	5	7.9	0.30	0.00	16.0	10.0	96*	7.7	0.20	0.03	10.0	5.0	96*	8.2	0.60	0.00	3.0	0.0	96*	6.2	0.00	0.00	0.0	0.0	24
"	6	8.4	1.00	0.10	15.0	8.0	96*	9.4	1.00	0.00	10.0	0.0	96*	8.1	0.60	0.00	5.0	0.0	96	5.5	0.00	0.00	0.0	0.0	12
"	7	8.8	0.20	0.00	12.0	10.0	96*	8.2	0.40	0.10	10.0	0.0	96*	6.9	0.00	—	7.0	—	60	8.1	0.10	0.00	1.0	0.0	10
"	8	8.8	0.20	0.50	1.0	10.0	96*	8.8	0.20	0.00	10.0	10.0	97*	7.2	0.40	0.02	7.0	1.0	96*	6.9	0.00	—	1.0	—	30
"	10	—	—	—	—	—	—	—	—	—	—	—	—	6.8	0.10	0.05	0.0	0.0	31	8.0	0.10	0.00	0.0	0.0	10
"	11	7.0	0.30	0.75	15.0	7.0	96*	7.6	0.80	0.00	5.0	0.0	20	5.1	0.00	0.05	0.0	0.0	22	4.6	0.00	0.00	0.0	0.0	19
"	12	6.9	0.40	0.02	10.0	1.0	96*	6.1	1.00	0.00	7.0	0.0	14	5.5	0.30	0.00	9.0	0.0	30	5.4	0.10	0.00	0.0	0.0	10
"	13	7.1	1.00	0.00	6.0	0.0	24	7.2	1.00	0.00	7.0	0.0	96*	6.1	0.40	0.00	5.0	0.0	96*	4.0	0.00	0.00	0.0	0.0	—
"	14	6.4	0.20	0.00	10.0	2.0	96*	7.0	0.20	0.10	10.0	1.0	96*	6.7	0.40	0.02	7.0	0.0	96*	5.5	0.00	0.02	0.0	0.0	26
"	17	6.6	1.00	0.00	10.0	0.0	80	6.0	1.00	0.00	10.0	0.0	40	6.6	1.40	0.00	8.0	0.0	25	4.2	0.00	0.00	0.0	0.0	16
"	18	—	—	—	—	—	—	—	—	—	—	—	—	6.6	1.00	0.00	5.0	0.0	50	5.7	0.10	0.00	0.0	0.0	16
"	19	7.1	0.40	0.03	10.0	12.0	96*	6.5	0.40	0.00	7.0	0.0	96*	7.0	0.40	0.03	8.0	0.0	33	6.9	0.10	0.00	0.0	0.0	—
"	20	7.0	0.90	3.00	16.0	12.0	96*	7.8	1.40	0.50	12.0	0.0	96*	7.2	1.00	0.05	8.0	0.0	96*	6.0	0.00	0.05	0.0	0.0	31
"	21	7.6	0.40	0.70	12.0	12.0	96*	7.3	0.40	0.15	10.0	10.0	96*	6.6	0.40	0.15	10.0	5.0	96*	6.5	0.00	0.05	0.0	0.0	32
"	24	6.6	1.00	0.00	7.0	0.0	30	5.9	1.30	0.30	10.0	0.0	20	5.3	0.10	0.01	10.0	1.0	96*	4.7	1.00	0.00	0.0	0.0	23
"	25	4.8	0.20	2.20	10.0	8.0	96*	6.0	0.00	0.20	10.0	0.0	96*	6.1	0.80	0.00	7.0	0.0	33	4.4	0.10	0.00	0.0	0.0	10
"	26	9.6	0.00	0.02	14.0	10.0	96*	9.0	0.04	0.00	14.0	6.0	96*	6.0	0.30	0.01	5.0	0.0	96*	7.9	0.00	0.00	3.0	0.0	41
"	27	8.6	1.20	0.00	10.0	12.0	96*	7.6	0.00	0.00	12.0	3.0	96*	6.7	2.00	0.10	8.0	0.0	96*	6.7	1.40	0.40	0.0	0.0	25
"	28	9.8	1.00	0.20	10.0	12.0	96*	9.0	0.00	0.10	10.0	1.0	96*	6.1	0.40	0.00	7.0	3.0	96*	7.2	0.44	0.00	1.0	0.0	96*
"	29	10.0	0.00	0.00	8.0	10.0	96*	9.0	0.10	0.50	8.0	7.0	96*	7.4	0.10	0.03	2.0	0.0	96*	6.7	0.00	0.00	2.0	0.0	9
March	2	8.8	0.30	3.00	12.0	12.0	96*	8.2	0.00	0.05	12.0	0.0	96*	6.9	0.40	0.00	7.0	0.0	33	4.5	0.00	0.00	1.0	0.0	13
"	3	8.8	0.14	0.40	12.0	12.0	96*	7.6	0.20	0.00	12.0	0.0	96*	6.0	0.00	0.00	5.0	0.0	31	4.0	0.00	0.00	0.0	0.0	11
"	4	8.5	0.40	1.00	12.0	12.0	96*	7.0	0.00	0.17	12.0	8.0	96*	6.2	0.00	—	7.0	0.0	96*	5.2	0.00	0.00	0.0	0.0	18
"	5	8.4	0.40	0.20	16.0	15.0	96*	8.8	1.00	0.40	12.0	10.0	96*	6.2	1.40	0.25	8.0	1.0	96*	6.0	0.00	0.00	0.0	0.0	19
"	6	9.0	0.30	0.10	8.0	12.0	96*	9.1	0.10	2.50	7.0	6.0	96*	7.4	0.80	0.15	3.0	0.0	96*	6.9	0.00	0.00	0.0	0.0	22
"	7	8.9	0.10	0.10	8.0	8.0	96*	10.4	0.10	0.04	7.0	6.0	96*	6.8	0.00	0.01	8.0	0.0	96*	6.4	0.00	0.00	0.0	0.0	25
"	9	8.0	0.20	0.20	—	8.0	96*	5.9	1.00	0.00	—	0.0	23	5.9	—	—	—	—	—	4.9	—	—	—	—	—
"	10	9.3	0.15	0.00	10.0	7.0	96*	5.9	0.20	0.00	1.0	0.0	96*	7.2	0.20	0.00	7.0	3.0	96*	—	—	—	—	—	—
"	11	7.0	0.05	0.40	16.0	12.0	96*	6.7	0.20	0.05	12.0	0.0	96*	5.5	0.25	0.00	10.0	0.0	96*	4.6	0.25	0.00	1.0	0.0	12
"	12	6.0	0.20	0.00	16.0	8.0	96*	6.7	0.20	0.00	10.0	1.0	96*	5.5	0.30	0.00	6.0	0.0	96*	—	—	—	—	—	—
"	13	8.2	0.15	0.40	12.0	12.0	96*	7.0	0.00	0.00	12.0	0.0	96*	6.5	0.25	0.01	10.0	1.0	96*	—	—	—	—	—	—
"	14	10.0	0.10	0.80	10.0	10.0	96*	7.8	0.01	0.00	8.0	0.0	96*	6.2	0.01	0.02	7.0	3.0	96*	—	—	—	—	—	—
"	16	6.6	1.00	0.20	12.0	8.0	96*	5.5	1.60	0.00	15.0	0.0	96*	5.7	1.50	0.00	5.0	0.0	19	—	—	—	—	—	—
"	17	8.1	0.10	0.10	15.0	15.0	96*	7.9	0.60	0.00	15.0	5.0	96*	5.8	1.20	0.00	7.0	1.0	96*	—	—	—	—	—	—
"	18	8.5	0.10	0.00	12.0	15.0	96*	9.0	0.15	0.00	12.0	12.0	96*	5.7	0.27	0.60	7.0	5.0	96*	8.5	0.10	0.00	1.0	0.0	17
"	19	7.8	0.10	0.40	20.0	12.0	96*	7.0	0.15	0.00	12.0	15.0	96*	6.1	0.30	0.05	10.0	5.0	96*	—	—	—	—	—	—
"	20	9.0	0.10	0.75	20.0	10.0	96*	6.7	0.10	0.20	16.0	10.0	96*	7.0	0.60	0.00	12.0	0.5	96*	—	—	—	—	—	—
"	21	6.9	0.10	0.00	20.0	16.0	96*	6.4	0.00	0.00	12.0	6.0	96*	7.0	0.00	0.02	10.0	0.5	96*	—	—	—	—	—	—
"	23	—	0.00	0.00	20.0	12.0	96*	—	0.20	0.00	20.0	3.0	96*	—	0.20	0.00	12.0	0.5	—	—	—	—	—	—	—
"	24	7.1	0.40	0.00	20.0	12.0	96*	5.0	0.20	0.03	18.0	0.5	96*	5.8	0.20	0.00	12.0	1.0	14	—	—	—	—	—	—
"	25	6.8	0.00	0.00	20.0	7.0	96*	6.6	0.25	0.00	20.0	1.0	—	4.7	0.25	—	4.0	—	—	2.0	0.30	0.00	1.0	0.0	10
"	26	8.3	0.10	0.75	10.0	20.0	96*	6.5	0.20	2.00	10.0	12.0	96*	6.2	0.20	0.20	10.0	1.0	—	3.4	0.10	0.00	3.0	0.0	24
"	27	7.0	0.12	0.00	25.0	25.0	96*	6.0	0.20	0.00	10.0	10.0	96*	6.4	0.25	0.00	6.0	0.5	96*	5.0	0.10	0.00	0.0	0.0	12
"	30	—	0.10	4.00	10.0	12.0	96*	—	0.30	3.00	7.0	4.0	96*	—	0.20	0.50	1.0	0.5	96*	—	0.20	0.00	1.0	0.5	14
"	31	—	0.10	0.90	20.0	10.0	96*	—	0.20	0.03	15.0	4.0	96*	—	0.25	0.25	10.0	2.0	96*	—	0.12	0.00	2.0	1.0	17
April	1	—	0.10	0.30	20.0	16.0	96*	—	0.20	0.70	10.0	7.0	96*	—	0.20	0.01	0.0	2.0	96*	—	0.05	0.00	1.0	0.5	20
"	2	—	0.30	0.40	20.0	20.0	96*	—	0.20	0.20	12.0	12.0	96*	—	0.25	0.00	5.0	1.0	96	—	0.16	0.05	1.0	1.0	15
"	3	—	0.30	0.20	20.0	20.0	96*	—	0.21	1.00	20.0	10.0	96*	—	0.20	0.05	1.0	1.0	96*	—	0.15	0.00	1.0	1.0	12
"	4	—	0.00	0.00	14.0	16.0	96*	—	0.00	0.00	12.0	12.0	96*	—	0.50	1.25	2.0	0.5	96*	—	0.00	1.25	2.0	1.0	16
"	6	—	0.10	0.10	15.0	12.0	96*	—	0.10	1.00	15.0	6.0	96*	—	0.10	0.00	4.0	0.5	96*	—	0.20	0.00	1.0	1.0	9
"	7	—	0.70	1.25	20.0	—	96*	—	0.30	0.10	20.0	—	96*	—	0.00	0.00	1.0	0.5	57	—	0.00	0.00	1.0	1.0	10
"	8	—	0.00	1.00	20.0	20.0	96*	—	0.20	2.75	15.0	12.0	96*	—	0.00	0.00	3.0	0.5	96*	—	0.05	0.00	0.5	0.5	11
"	9	—	0.40	0.40	20.0	20.0	96*	—	0.60	3.50	20.0	9.0	96*	—	1.00	0.00	4.0	0.5	60	—	0.05	0.00	0.0	0.5	11
"	10	—	0.20	0.20	12.0	16.0	96*	—	0.40	0.75	20.0	12.0	96*	—	0.50	0.00	7.0	1.0	96*	—	0.20	0.00	2.0	0.0	21
"	11	—	0.20	0.75	25.0	3.0	96*	—	1.00	0.00	20.0	10.0	96*	—	1.00	—	7.0	—	—	—	0.00	0.00	2.0	0.5	18
"	13	—	1.00	0.00	18.0	0.0	81	—	1.00	0.00	18.0	0.0	81	—	—	—	—	—	—	—	—	—	—	—	—
"	14	—	0.20	0.00	10.0	0.0	96*	—	0.10	0.15	12.0	0.0	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	15	—	0.10	1.00	15.0	6.0	96*	—	0.10	2.50	20.0	8.0	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	16	—	0.10	3.00	20.0	10.0	96*	—	0.20	1.00	20.0	12.0	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	18	—	0.20	0.40	7.0	3.0	96*	—	0.40	0.00	10.0	3.0	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	20	—	0.05	1.25	15.0	7.0	96*	—	0.30	0.00	12.0	1.0	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	21	—	0.20	0.00	15.0	7.0	96*	—	0.00	0.00	7.0	1.0	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	27	—	4.00	0.12	25.0	12.0	96*	—	0.60	1.50	7.0	0.5	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	28	—	0.90	0.80	16.0	7.0	96*	—	0.05	0.05	10.0	0.0	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	29	—	0.10	0.40	20.0	1.0	96*	—	0.30	0.10	25.0	3.0	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	30	—	0.10	0.75	10.0	25.0	96*	—	0.20	0.00	8.0	1.0	96*	—	—	—	—	—	—	—	—	—	—	—	—
May	1	—	0.00	0.00	8.0	12.0	96*	—	0.10	1.00	20.0	15.0	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	2	—	0.00	0.50	20.0	10.0	96*	—	0.40	1.50	20.0	20.0	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	4	—	0.20	0.10	12.0	25.0	96*	—	0.20	0.00	20.0	15.0	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	5	—	0.10	1.20	20.0	1.0	96*	—	0.20	1.00	20.0	2.0	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	6	—	0.12	0.00	20.0	1.0	96*	—	0.40	0.30	20.0	0.5	96*	—	—	—	—	—	—	—	—	—	—	—	—
"	8	—	2.40	0.10	20.0	8.0	96*	—	0.00	0.70	20.0	0.5	96*	—	—	—	—	—	—	—	—	—	—	—	—

*Indicates that sample was taken out of incubator before blue color disappeared.

TABLE No. 4

COMPARISON OF 37° MENTHYLENE BLUE INCUBATION TESTS OF FILTER AND SETTLED EFFLUENTS, SHOWING TIME COLOR WAS RETAINED

DATE 1908	4½' BEDS							
	1" TO 2" STONE				1" TO 3" STONE			
	Filtered Effluent		Settled Effluent		Filtered Effluent		Settled Effluent	
	Days	Hours	Days	Hours	Days	Hours	Days	Hours
May 26								
June 2								
" 5	7		21*		2	13	2	11
" 6	10		20*		3	1	6	
" 8		18	1	5		26	1	16
" 9	2	5	17*		1	7	1	10
" 10	6		16*		1	12	9	
" 11	2	9	15*			20	15*	
" 12	14*		14*			20	2	16
" 13	14*		14*		1	10	14*	
" 15	6		14*		1	2	14*	
" 16	1	15	3	9		11	1	15
" 17	2	6	1	16		17	2	2
" 18	5		15		1	13	1	13
" 19	2	14	8		1	15	2	12
" 20		18	4			18	6	15
" 22	1	7	6			16		19
" 23		23	1	23		17		19
" 24	1	12	2	9	1	2	1	12
" 25	2	18	2	20	1	16	2	6
" 26	1	2		10	1	5	2	8
" 27	3	17	3	20	1	11	2	3
" 29		15		19	1	10	1	12
" 30		17		20		14	1	16
July 1		16	1	3		16	1	18
" 2	1	8	1	3		14	1	7
" 3		20		19	1	4	1	7
" 6		14		22		8		19
" 7	2	21	17*			13	1	3
" 9	6		16*			12	3	4
" 10		15		20		14	1	8
" 11	1	14	5			18	1	15
" 14								
" 15								
" 16								
" 17								
" 24								
" 26								
" 27								
" 28								
" 29								
" 30								
" 31								
August 1								
" 5								
" 6								
" 12	1	5	1	20		21	2	1
" 13	5	9	7	9	1	1	2	
April 30								
May 1								
" 2								
" 4								
" 5								
" 6								
" 8								

DATE 1908	6' BEDS							
	1" TO 3" STONE				2" TO 4" STONE			
	Filtered Effluent		Settled Effluent		Filtered Effluent		Settled Effluent	
	Days	Hours	Days	Hours	Days	Hours	Days	Hours
May 26						12		17
June 2					24*		21*	
" 5								
" 6								
" 8								
" 9								
" 10								
" 11								
" 12								
" 13								
" 15								
" 16								
" 17								
" 18								
" 19								
" 20								
" 22								
" 23								
" 24								
" 25								
" 26								
" 27								
" 29								
" 30								
July 1								
" 2								
" 3								
" 6								
" 7								
" 9								
" 10								
" 11								
" 14		13	1	13		16		13
" 15		20				14		17
" 16	1	16	2	14		22		22
" 17	4		3	19		18	1	8
" 24	2	14	2	14	1	17	1	17
" 26	1		3		1		1	
" 27			7		4		7	
" 28		17	1	9		16		19
" 29	2	23	2	18	1	10	9	
" 30	3	12	7	16			1	19
" 31	4	13	14*			27		11
August 1	14*		14*		14*		14*	
" 5	5		13		5		6	
" 6	4	5	14*		3	6	3	6
" 12								
" 13								
	¾" TO 1½" STONE				1" TO 2" STONE			
April 30		21	2	14	4		2	22
May 1	4*		4*		4*		4*	
" 2	4*		4*		3	15	4*	
" 4	3	20	4*		4*		21*	
" 5	1	12	1	20	1	12	2	5
" 6	1	21	5	21	4	3	5	12
" 8	3	8	4*		4*		21*	

DATE 1908	7½' BEDS							
	1" TO 2" STONE				1" TO 3" STONE			
	Filtered Effluent		Settled Effluent		Filtered Effluent		Settled Effluent	
	Days	Hours	Days	Hours	Days	Hours	Days	Hours
May 26								
June 2								
" 5	21*		21*		2	10	3	15
" 6	20*		20*		3	9	20*	
" 8	18*		18*			21		21
" 9	17*		17*		1	8	2	10
" 10	16*		16*		1	12	16*	
" 11	15*		15*			20	3	15
" 12	14*		14*		1	15	3	
" 13	14*		14*		1	9	14*	
" 15	14*		14*		1	9	14*	
" 16	14*		14*		1	6	3	11
" 17	14*		14*		1	7	2	16
" 18	14*		14*		1	6	14*	
" 19	14*		14*		1	15	14*	
" 20	14*		14*			18	3	4
" 22	14*		14*			23		21
" 23	14*		14*		1	11		19
" 24	14*		14*		4		6	
" 25	14*		14*		6		13	
" 26	14*		14*		1	7	1	5
" 27	20*		20*		6		20*	
" 29	18*		18*			20	1	10
" 30	17*		17*		1	8	2	12
July 1	16*		16*		2	8	2	18
" 2	15*		15*		1	5	1	16
" 3	14*		14*		1	12	1	11
" 6	2	9	18*			16	1	12
" 7	17*		17*		2			
" 9	16*		16*		8		16*	
" 10	14*		14*		1	15	1	10
" 11	14*		14*		1	22	6	
" 14								
" 15								
" 16								
" 17								
" 24								
" 26								
" 27								
" 28								
" 29								
" 30								
" 31								
August 1								
" 5								
" 6								
" 12	14*	14*			7	6	14*	
" 13	14*	14*			14*		14*	
April 30								
May 1								
" 2								
" 4								
" 5								
" 6								
" 8								

DATE 1908	9' BEDS							
	1" TO 3" STONE				2" TO 4" STONE			
	Filtered Effluent		Settled Effluent		Filtered Effluent		Settled Effluent	
	Days	Hours	Days	Hours	Days	Hours	Days	Hours
May 26						19	1	2
June 2					24*		24*	
" 5								
" 6								
" 8								
" 9								
" 10								
" 11								
" 12								
" 13								
" 15								
" 16								
" 17								
" 18								
" 19								
" 20								
" 22								
" 23								
" 24								
" 25								
" 26								
" 27								
" 29								
" 30								
July 1								
" 2								
" 3								
" 6								
" 7								
" 9								
" 10								
" 11								
" 14		21	2	12		19		22
" 15	1	14	14*			22	3	17
" 16	6		14*		14*		14*	
" 17	14*		14*		14*		14*	
" 24	3	17	14*		4		14*	
" 26	2	14	14*		1		14*	
" 27	7		14*		14*		14*	
" 28		22	3	12		22		19
" 29	14*		14*		14*		14*	
" 30	14*		14*		14*		14*	
" 31	14*		14*		14*		14*	
August 1	14*		14*		14*		14*	
" 5	14*		14*		14*		14*	
" 6	14*		14*		14*		14*	
" 12								
" 13								
	¾" TO 1½" STONE				1" TO 2" STONE			
April 30	4*		4*		3	22	4*	
May 1	4*		4*		4*		4*	
" 2	4*		4*		4*		4*	
" 4	4*		4*		4*		21*	
" 5	4*		4*		4*		4*	
" 6	4*		1	5	4*		21*	
" 8	4*		4*		4*		21*	

DATE 1908	10½' BEDS							
	¾" TO 1½" STONE				1" TO 2" STONE			
	Filtered Effluent		Settled Effluent		Filtered Effluent		Settled Effluent	
	Days	Hours	Days	Hours	Days	Hours	Days	Hours
May 26								
June 2								
" 5	21*		21*		21*		21*	
" 6	20*		20*		20*		20*	
" 8	8		1	20	18*		18*	
" 9	17*		17*		17*		17*	
" 10	16*		16*		16*		16*	
" 11	15*		15*		15*		15*	
" 12	14*		14*		14*		14*	
" 13	14*		14*		14*		14*	
" 15	14*		14*		14*		14*	
" 16	14*		14*		14*		14*	
" 17	14*		14*		14*		14*	
" 18	14*		14*		14*		14*	
" 19	14*		14*		14*		14*	
" 20	14*		14*		14*		14*	
" 22	14*		14*		14*		14*	
" 23	14*		14*		14*		14*	
" 24	14*		14*		14*		14*	
" 25	14*		14*		14*		14*	
" 26	14*		14*		14*		14*	
" 27	20*		20*		20*		20*	
" 29	18*		18*		18*		18*	
" 30	17*		17*		17*		17*	
July 1	16*		16*		16*		16*	
" 2	15*		15*		15*		15*	
" 3	14*		14*		14*		14*	
" 6	18*		18*		18*		18*	
" 7	17*		17*		17*		17*	
" 9	16*		16*		16*		16*	
" 10	14*		14*		14*		14*	
" 11	14*		14*		14*		14*	
" 14								
" 15								
" 16								
" 17								
" 24								
" 26								
" 27								
" 28								
" 29								
" 30								
" 31								
August 1								
" 5								
" 6								
" 12	14*		14*		14*		14*	
" 13	14*		14*		14*		14*	
April 30								
May 1								
" 2								
" 4								
" 5								
" 6								
" 8								

DATE 1908	12' BEDS							
	2" TO 4" STONE				4" TO 6" STONE			
	Filtered Effluent		Settled Effluent		Filtered Effluent		Settled Effluent	
	Days	Hours	Days	Hours	Days	Hours	Days	Hours
May 26	1	2	1	9		12		14
June 2	24*		24*		3	7	12	
" 5								
" 6								
" 8								
" 9								
" 10								
" 11								
" 12								
" 13								
" 15								
" 16								
" 17								
" 18								
" 19								
" 20								
" 22								
" 23								
" 24								
" 25								
" 26								
" 27								
" 29								
" 30								
July 1								
" 2								
" 3								
" 6								
" 7								
" 9								
" 10								
" 11								
" 14	1	22	5			10		12
" 15	11		12			18		18
" 16	14*		14*			22	1	3
" 17	14*		14*		1	12	2	8
" 24	7	15	14*		1	22	3	5
" 26	14*		14*		1		2	16
" 27	14*		14*		3		7	
" 28	14*		14*			19		19
" 29	14*		14*				3	4
" 30	14*		14*		11	14*	14*	
" 31	14*		14*		8	11	14*	
August 1	14*		14*		14*		14*	
" 5	14*		14*		2		13	
" 6	14*		14*		4	17	14*	
" 12								
" 13								
	¾" TO 1½" STONE				1" TO 2" STONE			
April 30	4*		4*		4*		4*	
May 1	4*		4*		4*		4*	
" 2	4*		4*		4*		4*	
" 4	4*		4*		4*		21*	
" 5	4*		4*		4*		4*	
" 6	4*		4*		4*		21*	
" 8	4*		4*		4*		21*	

*Indicates that sample was taken out of incubator before blue color disappeared.

TABLE No. 5.

RELATIVE STABILITY NUMBERS OF SPRINKLING FILTER EFFLUENTS.

DATE 1907-8		6 FOOT BEDS								9 FOOT BEDS								12 FOOT BEDS							
		½" TO 1½" STONE		1" TO 2" STONE		2" TO 4" STONE		4" TO 6" STONE		½" TO 1½" STONE		1" TO 2" STONE		2" TO 4" STONE		4" TO 6" STONE		½" TO 1½" STONE		1" TO 2" STONE		2" TO 4" STONE		4" TO 6" STONE	
		Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number
RESULTS FROM INCUBATION AT 20° C.																									
October	9	—	—	—	—	33	27	33	27	—	—	—	—	48	36	33	27	—	—	—	—	88	57	33	27
"	10	—	—	—	—	40	32	1	1	—	—	—	—	57	42	33	27	—	—	—	—	96*	95	33	27
"	11	—	—	—	—	66	47	33	27	—	—	—	—	88	57	35	28	—	—	—	—	96*	95	42	33
"	23	51	37	35	28	—	—	—	—	56	40	40	32	—	—	—	—	55	40	59	43	—	—	—	—
"	24	37	30	37	30	—	—	—	—	44	34	51	37	—	—	—	—	80	57	44	31	—	—	—	—
"	25	25	20	31	25	—	—	—	—	86	57	42	33	—	—	—	—	42	33	86	57	—	—	—	—
"	28	44	34	33	27	—	—	—	—	51	37	51	37	—	—	—	—	96*	95	86	57	—	—	—	—
"	29	40	32	35	28	—	—	—	—	96*	95	46	35	—	—	—	—	96*	95	79	53	—	—	—	—
"	30	—	—	—	—	31	25	31	25	—	—	—	—	31	25	31	25	—	—	—	—	31	25	31	25
"	31	—	—	—	—	18	16	18	16	—	—	—	—	33	27	18	16	—	—	—	—	37	30	4	4
November	1	—	—	—	—	31	25	24	21	—	—	—	—	55	40	31	25	—	—	—	—	79	53	31	25
"	7	55	40	46	36	—	—	—	—	48	36	84	56	—	—	—	—	84	56	53	40	—	—	—	—
"	8	88	57	88	57	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	9	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	11	26	22	24	21	—	—	—	—	44	34	48	36	—	—	—	—	44	34	48	36	—	—	—	—
"	12	31	25	40	32	—	—	—	—	81	54	88	57	—	—	—	—	96*	95	96*	95	—	—	—	—
"	13	96*	95	44	34	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	21	96*	95	44	34	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	42	33	—	—	—	—
"	22	96*	95	79	53	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	23	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96	60	—	—	—	—
"	25	46	35	46	35	—	—	—	—	62	45	96*	95	—	—	—	—	96*	95	—	—	—	—	—	—
"	26	66	47	52	39	—	—	—	—	96*	95	96*	95	—	—	—	—	—	—	—	—	—	—	—	—
"	27	96*	95	57	42	—	—	—	—	96*	95	96*	95	—	—	—	—	—	—	—	—	—	—	—	—
"	29	—	—	—	—	44	34	20	17	—	—	—	—	62	45	31	25	—	—	—	—	96*	95	42	33
"	30	—	—	—	—	96*	95	66	47	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95
December	3	62	45	40	32	—	—	—	—	96*	95	40	32	—	—	—	—	96*	95	48	37	—	—	—	—
"	4	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	5	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	6	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	7	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	9	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	10	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	11	—	—	—	—	40	32	22	19	—	—	—	—	40	32	26	22	—	—	—	—	51	37	33	27
"	12	—	—	—	—	37	30	26	22	—	—	—	—	35	29	40	32	—	—	—	—	37	30	57	42
"	13	—	—	—	—	40	32	22	19	—	—	—	—	96*	95	40	32	—	—	—	—	—	—	96*	95
"	16	—	—	—	—	38	30	20	17	—	—	—	—	96*	95	51	37	—	—	—	—	96*	95	57	42
"	17	—	—	—	—	38	30	37	30	—	—	—	—	96*	95	33	27	—	—	—	—	96*	95	64	46
"	18	96*	95	44	34	—	—	—	—	96*	95	48	37	—	—	—	—	96*	95	51	37	—	—	—	—
"	19	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	20	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	21	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	23	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	24	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	26	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	27	96*	95	96	60	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	28	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	30	96*	95	96*	95	53	39	18	16	96*	95	96*	95	68	48	40	32	96*	95	96*	95	96*	95	70	49
January	2	44	34	25	21	53	39	20	17	53	40	48	36	57	42	40	32	96*	95	48	36	57	42	48	36
"	3	96*	95	55	40	68	48	20	17	96*	95	96*	95	96*	95	55	40	96*	95	96*	95	96*	95	68	48
"	6	51	37	48	36	64	46	31	25	96*	95	64	46	73	50	33	27	96*	95	73	50	96*	95	51	37
"	7	96*	95	30	25	57	42	26	22	96*	95	96*	95	96*	95	44	34	96*	95	96*	95	96*	95	48	36
"	8	81	54	64	46	96*	95	29	24	96*	95	96*	95	96*	95	51	37	96*	95	96*	95	96*	95	51	37
"	9	79	53	48	36	96*	95	51	37	96*	95	81	54	96*	95	86	56	96*	95	96*	95	96*	95	96*	95
"	10	96*	95	79	53	96*	95	29	24	96*	95	96*	95	96*	95	62	45	96*	95	96*	95	96*	95	81	54
"	11	96*	95	96*	95	96*	95	59	43	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
"	13	37	30	37	30	48	37	22	19	57	42	57	42	88	57	35	28	96*	95	96*	95	96*	95	37	30
"	14	46	35	46	35	53	39	22	18	42	33	26	22	96*	95	31	25	96*	95	96*	95	96*	95	52	39
"	15	57	42	75	52	57	42	22	19	84	56	96*	95	96*	95	57	42	96*	95	96*	95	96*	95	67	48
"	16	96*	95	96*	95	96*	95	18	16	96*	95	96*	95	96*	95	—	—	96*	95	96*	95	96*	95	88	57
"	17	96*	95	96*	95	96*	95	59	43	96*	95	96*	95	96*	95	70	49	96*	95	96*	95	96*	95	70	49
"	18	96*	95	96*	95	96*	95	59	43	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
"	20	75	52	51	37	44	34	20	17	73	52	79	53	79	53	22	19	96*	95	96*	95	96*	95	44	34
"	21	96*	95	53	39	68	48	18	16	96*	95	96*	95	96*	95	29	24	96*	95	96*	95	96*	95	57	42
"	24	96*	95	86	57	64	46	15	13	96*	95	96*	95	96*	95	29	24	96*	95	96*	95	96*	95	46	36
"	25	96*	95	64	46	64	46	27	23	96*	95	96*	95	96*	95	64	46	96*	95	96*	95	96*	95	64	46
"	27	96*	95	70	49	48	36	18	16	96*	95	96*	95	—	—	—	—	96*	95	96*	95	31	25	22	19
"	28	53	39	53	40	—	—	—	—	96*	95	96*	95	—	—	18	16	96*	95	96*	95	—	—	—	—
"	29	96*	95	96*	95	96*	95	26	22	96*	95	96*	95	96*	95	66	47	96*	95	96*	95	96*	95	79	53
"	30	96*	95	96*	95	70	49	51	37	96*	95	96*	95	96*	95	66	47	96*	95	96*	95	96*	95	66	47
"	31	96*	95	84	56	96*	95	31	25	96*	95	96*	95	96*	95	57	42	96*	95	96*	95	96*	95	75	52
February	1	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	88	57
"	3	96*	95	96*	95	96*	95	73	50	96*	95	96*	95	96*	95	84	56	96*	95	96*	95	96*	95	96*	95
"	4	—	—	—	—	57	42	22	19	—	—	—	—	59	43	33	27	—	—	—	—	64	46	73	50
"	5	96*	95	96*	95	24	21	24	21	96*	95	96*	95	96*	95	53	40	96*	95	96*	95	96*	95	77	52
"	6	96*	95	81	54	53	39	26	22	96*	95	96*	95	96*	95	40	32	96*	95	96*	95	96*	95	53	40
"	7	96*	95	90	58	40	32	24	21	96*	95	96*	95	96*	95	33	27	96*	95	96*	95	96*	95	44	34
"	8	96*	95	96*	95	96*	95	46	37	96*	95	96*	95	96*	95	88	57	96*	95	96*	95	96*	95	96*	95
"	10	—	—	—	—	24	21	20	17	—	—	—	—	68	48	22	19	—	—	—	—	70	49	24	21
"	11	96*	95	96*	95	35	28	18	16	96*	95	96*	95	86	57	26	22	96*	95	96*	95	96*	95	42	33
"	12	86	57	84	56	48	36	18	16	96*	95	96*	95	86	57	22	19	96*	95	96*	95	96*	95	64	46
"	13	96*	95	96*	95	79	53	84	56	75	52	96*	95	96*	95	—	—	96*	95	96*	95	96*	95	75	52
"	14	96*	95	96*	95	68	48	—	—	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	—	—
"	17	96*	95	77	52	46	35	26	22	96*	95	96*	95	77	52	35	28	96*	95	96*	95	77	52	40	32
"	18	—	—	—	—	66	47	33	27	—	—	—	—	96*	95	33	27	—	—	—	—	96*	95	35	28
"	19	96*	95	96*	95	79	53	37	30	96*	95	96*	95	66	47	—	—	96*	—	96*	95	96*	95	79	53
"	20	96*	95	96*	95	79	53	35	28	96*	95	96*	95	96*	95	79	53	96*	95	96*	95	96*	95	75	52
"	21	96*	95	96*	95	96*	95	51	37	96*	95	96*	95	96*	95	70	49	96*	95	96*	95	96*	95	96*	95
"	24	73	50	55	40	75	52	73	50	88	57	88	57	96*	95	73	50	96*	95	73	50	96*	95	73	50
"	25	96*	95	79	53	73	50	20	17	96*	95	96*	95	96*	95	22	19	96*	95	96*	95	96*	95	35	28
"	26	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	68	48	96*	95	96*	95	96*	95	96*	95
"	27	96*	95	96*	95	77	52	35	28	96*	95	96*	95	96*	95	53	39	96*	95	96*	95	96*	95	96*	95
"	28	96*	95	96*	95	96*	95	35	28	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	70	49
"	29	96*	95	96*	95	96*	95	44	34	96*	95	96*	95	96*	95	20	17	96*	95	96*	95	96*	95	90	58
March	2	96*	95	96*	95	31	25	22	19	96*	95	96*	95	84	56	29	24	96*	95	96*	95	96*	95	53	39
"	3	96*	95	77	52	33	27	22	19	96*	95	96*	95	68	48	24	21	96*	95	96*	95	77	52	33	27
"	4	72	50	96*	95	66	47	24	21	96*	95	96*	95	96*	95	40	32	96*	95	96*	95	96*	95	79	53
"	5	96*	95	96*	95	68	48	42	33	96*	95	96*	95	96*	95	42	33	96*	95	96*	95	96*	95	68	48
"	6	—	—	—	—	88	57	77	52	96*	95	96*	95	96*	95	79	53	96*	95	96*	95	96*	95	96*	95
"	7	96*	95	96*	95	96*	95	24	21	96*	95	96*	95	96*	95	77	52	96*	95	96*	95	96*	95	88	57
"	9	81	54	81	54	—	—	—	—	96*	95	96*	95	96*	95	—	—	96*	95	96*	95	96*	95	—	—
"	10	96*	95	96*	95	96	60	—	—	96*	95	96*	95	96*	95	—	—	96*	95	96*	95	96*	95	64	46
"	11	96*	95	96*	95	64	46	26	22	96*	95	96*	95	96*	95	40	32	96*	95	96*	95	96*	95	—	—
"	12	96*	95	96*	95	86	57	—	—	96*	95	96*	95	96*	95	—	—	96*	95	96*	95	96*	95	—	—
"	13	96*	95	96*	95	96*	95	—	—	96*	95	96*	95	96*	95	—	—	96*	95	96*	95	96*	95	—	—
"	14	96*	95	96*	95	92	59	—	—	96*	95	96*	95	96*	95	—	—	96*	95	96*	95	96*	95	—	—
"	16	44	34	35	28	96	60	—	—	96*	95	96*	95	42	33	—	—	96*	95	96*	95	96*	95	—	—
"	17	81	54	96*	95	33	27	—	—	96*	95	96*	95	96*	95	—	—	96*	95	96*	95	96*	95	—	—
"	18	96*	95	96*	95	66	47	20	17	96*	95	96*	95	96*	95	37	30	96*	95	96*	95	96*	95	66	47
"	19	96*	95	96*	95	62	45	—	—	96*	95	96*	95	96*	95	—	—	96*	95	96*	95	96*	95	—	—
"	20	96*	95	—	—	79	53	—	—	96*	95	96*	95	96*	95	—	—	96*	95	96*	95	96*	95	—	—
"	21	96*	95	96*	95	40	32	—	—	96*	95	96*	95	96*	95	—	—	96*	95	96*	95	96*	95	—	—
"	23	—	—	48	36	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	75	52	—	—
"	24	96*	95	84	56	84	56	—	—	96*	95	96*	95	96*	95	—	—	96*	95	96*	95	96*	95	—	—
"	25	—	—	—	—	29	24	22	19	96*	95	—	—	—	—	22	19	96*	95	96*	95	96*	95	26	22
"	26	96*	95	96*	95	77	52	—	—	96*	95	96*	95	—	—	66	47	96*	95	—	—	—	—	79	53
"	27	96*	95	96*	95	70	49	29	24	96*	95	96*	95	96*	95	29	24	96*	95	96*	95	96*	95	59	43
"	28	81	54	77	52	87	56	29	24	96*	95	96*	95	96*	95	31	25	96*	95	96*	95	96*	95	37	30
"	31	96*	95	96*	95	88	57	29	24	96*	95	96*	95	96*	95	37	30	96*	95	96*	95	96*	95	81	54
April	1	20	17	96*	95	81	54	—	—	96*	95	96*	95	96*	95	62	45	96*	95	96*	95	96*	95	73	50
"	2	96*	95	96*	95	—	—	20	17	96*	95	96*	95	96*	95	33	27	96*	95	96*	95	96*	95	48	36
"	3	51	37	96*	95	40	32	37	30	96*	95	96*	95	96*	95	29	24	96*	95	96*	95	96*	95	75	52
"	4	96*	95	96*	95	37	30	24	21	96*	95	96*	95	96*	95	35	28	96*	95	96*	95	96*	95	42	33
"	6	96*	95	70	49	—	—	15	13	96*	95	96*	95	96*	95	20	17	96*	95	96*	95	96*	95	24	21
"	7	81	54	70	49	33	27	15	13	96*	95	96*	95	81	54	22	19	96*	95	96*	95	81	54	22	19
"	8	96*	95	96*	95	51	37	15	13	96*	95	96*	95	96*	95	24	21	96*	95	96*	95	96*	95	29	24
"	9	88	57	96*	95	35	28	24	21	96*	95	96*	95	96*	95	24	21	96*	95	96*	95	96*	95	29	24
"	10	96*	95	96*	95	38	30	35	28	96*	95	96*	95	96*	95	40	32	96*	95	96*	95	96*	95	66	47
"	11	29	24	26	22	59	43	24	21	96*	95	96*	95	—	—	40	32	96*	95	96*	95	96*	95	57	42
"	13	92	59	77	52	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	14	81	54	81	54	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	15	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	16	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	18	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	20	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	21	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	27	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	28	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	29	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	30	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
May	1	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	2	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	4	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	5	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	6	96*	95	96*	95	—	—	—	—	64	46	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—
"	8	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—	96*	95	96*	95	—	—	—	—

*Indicates that sample was taken out of incubator before blue color disappeared.

TABLE No. 6

RELATIVE STABILITY NUMBERS OF SPRINKLING FILTER EFFLUENTS

Results from Incubation at 20° C.

Date 1908	4½ Foot Beds								7½ Foot Beds								10½ Foot Beds							
	1" to 2" Stone				1" to 3" Stone				1" to 2" Stone				1" to 3" Stone				½" to 1½" Stone				1" to 2" Stone			
	Filtered Effluent		Settled Effluent		Filtered Effluent		Settled Effluent		Filtered Effluent		Settled Effluent		Filtered Effluent		Settled Effluent		Filtered Effluent		Settled Effluent		Filtered Effluent		Settled Effluent	
	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number
June 5	96*	95	96*	95	91	54	96*	96	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 6	96*	95	96*	95	55	40	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 8	49	33	64	46	47	42	89	57	96*	95	96*	95	46	33	46	35	96*	95	96*	95	96*	95	96*	95
" 9	96*	95	96*	95	68	48	93	64	96*	95	96*	95	73	70	96*	95	96*	95	96*	95	96*	95	96*	95
" 10	96*	95	96*	95	79	53	96*	63	96*	95	96*	95	79	52	96*	95	96*	95	96*	95	96*	95	96*	95
" 11	96*	95	96*	95	44	34	96*	95	96*	95	96*	95	44	34	96*	95	96*	95	96*	95	96*	95	96*	95
" 12	96*	95	96*	95	44	34	96*	95	96*	95	96*	95	81	37	96*	95	96*	95	96*	95	96*	95	96*	95
" 13	96*	95	96*	95	75	52	96*	95	96*	95	96*	95	73	50	96*	95	96*	95	96*	95	96*	95	96*	95
" 15	96*	95	96*	95	57	42	96*	95	96*	95	96*	95	70	49	96*	95	96*	95	96*	95	96*	95	96*	95
" 16	91	57	96*	95	21	21	86	57	96*	95	96*	95	66	47	96*	95	96*	95	96*	95	96*	95	96*	95
" 17	96*	95	68	57	67	50	96*	95	96*	95	96*	95	68	48	96*	95	96*	95	96*	95	96*	95	96*	95
" 18	96*	95	96*	95	91	54	81	54	96*	95	96*	95	66	47	96*	95	96*	95	96*	95	96*	95	96*	95
" 19	96*	95	96*	95	86	57	96*	95	96*	95	96*	95	86	57	96*	95	96*	95	96*	95	96*	95	96*	95
" 20	40	32	96*	95	40	32	96*	95	96*	95	96*	95	40	32	96*	95	96*	95	96*	95	96*	95	96*	95
" 22	68	48	96*	95	35	28	42	33	96*	95	96*	95	51	37	51	47	96*	95	96*	95	96*	95	96*	95
" 23	51	37	96*	95	57	30	42	33	96*	95	96*	95	77	33	43	33	96*	95	96*	95	96*	95	96*	95
" 24	79	53	96*	95	57	42	79	53	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 25	96*	95	96*	95	88	57	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 26	70	49	23	19	64	46	96*	95	96*	95	96*	95	68	48	70	49	96*	95	96*	95	96*	95	96*	95
" 27	96*	95	96*	95	77	50	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 29	33	27	40	32	75	52	79	53	96*	95	96*	95	44	31	95	90	96*	95	96*	95	96*	95	96*	95
" 30	37	30	44	34	31	25	86	57	96*	95	96*	95	50	43	96*	95	96*	95	96*	95	96*	95	96*	95
July 1	35	28	59	43	25	28	90	59	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 2	59	43	59	43	31	25	68	48	96*	95	96*	95	50	45	50	57	96*	95	96*	95	96*	95	96*	95
" 5	44	34	49	36	62	45	68	48	96*	95	96*	95	79	33	77	33	96*	95	96*	95	96*	95	96*	95
" 6	31	25	48	36	13	12	43	36	96*	95	96*	95	35	28	79	53	96*	95	96*	95	96*	95	96*	95
" 7	96*	95	96*	95	29	24	70	43	96*	95	96*	95	96*	95	----	----	96*	95	96*	95	96*	95	96*	95
" 9	96*	95	96*	95	29	24	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 10	33	27	44	34	31	25	70	49	96*	95	96*	95	66	57	75	38	96*	95	96*	95	96*	95	96*	95
" 11	84	56	96*	95	40	32	96	67	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 12	64	46	96*	95	46	35	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 13	96*	95	96*	95	55	40	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
August 12	64	46	93	64	46	35	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 13	96*	95	96*	95	55	40	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 14	96*	95	96*	95	44	34	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
	Correction for residual Chlorine applied after August 14.								Correction for residual Chlorine applied after August 14.								Correction for residual Chlorine applied after August 14.							
" 17	96*	95	96*	95	38	30	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 18	50	37	68	47	46	35	----	----	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 19	92	59	96*	95	43	34	----	----	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 20	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 21	96*	95	96*	95	58	57	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 22	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 24	35	28	57	42	35	28	84	56	96*	95	96*	95	76	49	96*	95	96*	95	96*	95	96*	95	96*	95
" 25	45	36	53	38	41	30	----	----	96*	95	96*	95	96	60	96*	95	96*	95	96*	95	96*	95	96*	95
" 27	67	51	96*	95	96	58	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 28	66	47	96*	95	40	32	----	----	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 29	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 31	68	48	96*	95	44	34	85	56	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
September 1	68	44	96*	95	37	30	72	50	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 2	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 4	71	51	85	56	77	53	96*	95	96*	95	96*	95	15	16	96*	95	96*	95	96*	95	96*	95	96*	95
October 6	39	31	38	30	35	28	96*	95	77	53	77	63	61	44	96*	95	96*	95	96*	95	96*	95	96*	95
" 7	27	20	27	20	27	22	96*	95	96*	95	96*	95	44	34	96*	95	96*	95	96*	95	96*	95	96*	95
" 8	29	21	29	24	29	24	37	42	96*	95	96*	95	40	41	96*	95	96*	95	96*	95	96*	95	96*	95
" 9	30	24	33	40	24	23	96*	95	96*	95	96*	95	62	45	96*	95	96*	95	96*	95	96*	95	96*	95
" 13	29	21	29	24	29	21	96*	95	54	40	53	43	96	49	96*	95	96*	95	96*	95	96*	95	96*	95
" 14	40	29	45	36	25	19	37	30	61	47	54	40	49	35	87	57	96*	95	96*	95	96*	95	96*	95
" 15	22	19	21	18	22	19	96*	95	45	35	54	40	30	25	75	52	96*	95	96*	95	96*	95	96*	95
" 16	19	16	21	18	21	15	96*	95	78	52	96*	95	95	52	77	53	96*	95	96*	95	96*	95	96*	95
" 19	20	17	20	17	19	16	67	46	50	38	90	58	22	19	46	33	96*	95	96*	95	96*	95	96*	95
" 20	20	17	21	18	63	45	96*	95	68	48	70	49	41	37	52	35	96*	95	96*	95	96*	95	96*	95
" 21	36	27	24	22	22	19	64	38	94	59	88	58	36	28	87	57	96*	95	96*	95	96*	95	96*	95
" 22	23	19	30	26	26	22	96*	95	65	46	65	46	30	24	96*	95	96*	95	96*	95	96*	95	96*	95
" 23	35	28	37	29	30	23	96*	95	79	53	96*	95	16	14	20	17	96*	95	96*	95	96*	95	96*	95
" 26	33	27	34	27	28	22	70	49	96*	95	34	27	64	46	20	17	96*	95	96*	95	96*	95	96*	95
" 28	16	14	16	14	16	14	96*	95	79	52	46	35	22	19	60	33	96*	95	96*	95	96*	95	96*	95
" 29	22	19	34	27	18	16	96*	95	96*	95	96*	95	67	47	96*	95	96*	95	96*	95	96*	95	96*	95
" 30	73	52	96*	95	72	52	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
November 2	80	59	35	29	45	35	96*	95	96*	95	96*	95	38	30	35	29	96*	95	96*	95	96*	95	96*	95
" 4	41	37	31	25	31	25	96*	95	54	40	49	44	31	25	68	48	96*	95	96*	95	96*	95	96*	95
" 6	40	25	43	26	46	36	96*	95	70	49	70	49	46	34	70	48	96*	95	96*	95	96*	95	96*	95
" 9	27	22	27	22	30	25	37	30	86	60	38	27	68	48	68	48	96*	95	96*	95	96*	95	96*	95
" 10	21	19	21	18	19	16	77	58	38	30	40	35	21	18	69	48	96*	95	96*	95	96*	95	96*	95
" 11	21	18	21	18	22	19	96*	95	33	28	53	38	23	19	96*	95	96*	95	96*	95	96*	95	96*	95
" 12	33	24	46	35	29	24	87	57	53	39	45	35	29	24	96*	95	96*	95	96*	95	96*	95	96*	95
" 17	31	25	26	22	19	16	30	22	49	36	49	36	31	25	31	25	96*	95	96*	95	92	59	85	56
" 18	29	20	22	19	19	16	21	18	50	40	46	35	31	25	31	25	96*	95	96*	95	96*	95	96*	95
" 20	22	19	22	19	25	21	20	17	37	30	70	49	25	21	25	21	96*	95	96*	95	96*	95	96*	95
" 23	21	18	21	18	13	12	22	19	30	24	29	24	22	19	22	20	96*	95	82	55	55	40	96*	95
" 25	29	27	14	12	11	10	11	10	37	30	45	35	23	19	25	23	96*	95	46	35	68	48	82	55
" 27	10	8	10	9	9	8	9	8	32	26	32	23	14	12	17	15	96*	95	96*	95	79	53	47	38

TABLE No. 7

RELATIVE STABILITY NUMBERS OF SPRINKLING FILTER EFFLUENTS

Results from Incubation at 20° C.

Date 1908	6 Foot Beds								9 Foot Beds								12 Foot Beds							
	1" to 3" Stone				2" to 4" Stone				1" to 3" Stone				2" to 4" Stone				2" to 4" Stone				4" to 6" Stone			
	Filtered Effluent		Settled Effluent		Filtered Effluent		Settled Effluent		Filtered Effluent		Settled Effluent		Filtered Effluent		Settled Effluent		Filtered Effluent		Settled Effluent		Filtered Effluent		Settled Effluent	
	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number	Hours Blue Color is Retained	Relative Stability Number
May 25	----	----	----	----	26	22	37	30	----	----	----	----	47	36	57	44	47	42	73	50	26	22	31	25
June 3	----	----	----	----	96*	95	96*	95	----	----	----	----	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
July 14	23	21	81	54	22	19	29	24	15	15	96*	95	29	24	51	37	96*	95	96*	95	22	19	35	29
" 15	44	34	----	----	31	25	37	30	51	37	96*	95	48	36	96*	95	96*	95	96*	95	40	32	40	32
" 16	58	57	96*	95	48	35	48	38	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	48	36	59	43
" 17	96*	95	96*	95	40	32	70	49	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	79	53	96*	95
" 24	96*	95	96*	95	90	58	90	58	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 25	52	39	96*	95	52	39	52	39	96*	95	96*	95	33	29	96*	95	96*	95	96*	95	53	39	96*	95
" 27	----	----	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 28	37	30	73	50	42	33	42	33	45	35	96*	95	48	38	42	33	96*	95	96*	95	42	33	42	33
" 29	96*	95	96*	95	95	60	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	----	----	96*	95
" 30	96*	95	96*	95	----	----	95	60	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 31	96*	95	96*	95	59	42	91	58	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
August 1	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 5	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 6	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
	Correction for residual Chlorine applied after August 6.								Correction for residual Chlorine applied after August 6.								Correction for residual Chlorine applied after August 6.							
September 8	96*	95	96*	95	80	58	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 9	96*	95	96*	95	69	48	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 10	96*	95	96*	95	89	55	61	44	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 11	79	52	96*	95	58	50	49	39	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	59	43	96*	95
" 14	96*	95	96*	95	42	33	42	32	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 15	89	58	86	57	46	35	45	33	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	89	56	96*	95
" 16	96*	95	96*	95	70	49	86	57	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 17	96*	95	96*	95	20	17	62	45	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	62	45	96*	95
" 18	69	48	96*	95	44	34	73	51	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	66	47	96*	95
" 21	47	37	96*	95	40	32	50	37	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	81	54	96*	93
" 22	33	27	96*	95	34	27	62	46	96*	95	96*	95	43	34	89	58	96*	95	96*	95	54	41	71	49
" 23	47	36	96*	95	51	37	60	44	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	79	53	96*	95
" 24	50	37	96*	95	55	40	68	48	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 25	11	10	96*	95	94	59	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 28	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 29	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 30	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
October 1	96*	95	96*	95	90	58	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95
" 2	96*	95	96*	95	95	58	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95	96*	95

APPENDIX III

Studies of Disinfection of Sprinkling Filter Effluents

TABLES 1 TO 3

"	26	3.15 P. M.	9.7	959.2	116	1.3	9.6	10.7	0.25	60,000	5,600	900	50	600	0	100	10	1,000	100	7.0
"	27	9.30 A. M.	—	—	—	—	—	—	—	120,000	5,600	900	30	400	10	—	—	—	—	—
"	27	12.00 Noon.	7.9	787.5	115	1.1	—	—	0.25	90,000	1,200	1,500	70	400	0	1,000	10	100	100	—
"	27	3.15 P. M.	9.8	694.7	109	1.5	14.0	10.4	0.25	50,000	1,400	400	40	300	0	100	100	100	10	6.0
"	28	9.30 A. M.	9.8	754.5	89	1.1	—	—	0.25	120,000	4,300	1,300	110	600	10	1,000	1,000	100	1,000	—
"	28	12.00 Noon.	9.9	886.6	104	1.9	—	—	0.30	90,000	2,000	2,700	10	1,400	0	—	—	—	—	—
"	28	3.15 P. M.	9.7	724.0	112	1.6	9.4	11.5	0.25	†	1,400	500	20	300	10	10,000	100	100	10	6.0
"	29	9.30 A. M.	8.2	694.7	104	1.2	—	—	0.20	110,000	400	4,800	170	100	0	1,000	100	100	1,000	—
"	29	12.00 Noon.	8.1	608.1	128	1.7	—	—	0.20	†	900	300	30	300	0	1,000	10	1,000	1	—
March	2	9.30 A. M.	7.0	694.7	129	1.3	—	—	0.15	30,000	1,000	400	100	300	0	—	—	—	—	—
"	2	12.00 Noon.	7.0	694.7	128	1.5	—	—	0.00	180,000	1,500	700	100	600	10	1,000	100	1,000	10	—
"	2	3.15 P. M.	10.2	664.8	131	2.0	8.2	9.6	0.25	70,000	600	300	40	200	0	10,000	1,000	100	100	7.0
"	3	9.30 A. M.	10.5	694.7	140	2.1	—	—	0.50	60,000	1,000	1,000	50	1,000	0	1,000	100	100	1	—
"	3	12.00 Noon.	10.6	724.6	153	2.2	—	—	0.50	120,000	1,200	4,000	100	3,000	0	—	—	—	—	—
"	3	3.15 P. M.	10.5	664.8	164	2.4	9.0	9.8	0.50	90,000	900	300	40	300	0	1,000	10	100	100	6.0
"	4	9.30 A. M.	10.1	694.7	146	2.1	—	—	0.75	90,000	†	1,300	50	500	0	10	100	1,000	100	—
"	4	12.00 Noon.	10.1	664.8	146	2.1	—	—	0.80	130,000	600	1,000	60	1,000	0	100	100	1,000	10	—
"	4	3.15 P. M.	10.9	554.4	132	2.4	8.6	9.2	0.70	20,000	100	1,300	60	600	0	—	—	—	—	8.0
"	5	9.30 A. M.	9.7	694.7	119	1.6	—	—	0.30	50,000	900	1,000	50	800	0	—	—	—	—	—
"	5	12.00 Noon.	9.8	634.0	125	1.9	—	—	0.25	60,000	1,400	2,400	200	1,500	0	10	10	100	100	—
"	5	3.15 P. M.	9.4	554.4	142	2.4	9.4	9.2	0.80	40,000	500	*	*	*	*	100	100	10,000	100	7.5
"	6	9.30 A. M.	9.0	820.5	108	1.5	—	—	0.50	90,000	700	1,000	240	300	0	1,000	100	1,000	100	—
"	6	12.00 Noon.	10.4	820.5	170	2.1	—	—	1.00	50,000	2,000	2,100	50	1,400	0	—	—	—	—	—
"	6	3.15 P. M.	10.5	886.6	171	2.0	11.6	10.4	1.20	†	†	1,300	150	800	0	1,000	10	10,000	1,000	7.0
"	7	9.30 A. M.	10.5	959.2	103	1.5	—		0.65	—	—	1,400	40	900	0	100	10	1,000	10	—
"	7	12.00 Noon.	10.4	886.6	161	1.9	9.9	10.1	0.30	120,000	900	1,500	70	700	0	—	—	—	—	9.0
"	9	9.30 A. M.	10.2	886.6	114	1.3	—	—	0.25	110,000	1,600	1,200	60	1,000	0	1,000	100	1,000	100	—
"	9	12.00 Noon.	10.4	922.9	117	1.3	—	—	0.00	120,000	2,000	1,700	60	1,400	10	—	—	—	—	—
"	9	3.15 P. M.	10.5	787.5	145	1.9	8.9	9.5	0.60	60,000	800	900	50	400	0	10,000	100	1,000	10	6.0
"	10	9.30 A. M.	10.1	886.6	129	1.8	10.0	10.4	0.55	90,000	1,300	1,300	100	70	20	1,400	1,000	—	—	6.0
"	10	12.00 Noon.	10.5	886.6	156	1.8	—	—	0.46	80,000	4,800	600	60	300	0	—	—	—	—	—
"	10	3.15 P. M.	10.9	787.5	149	2.0	—	—	0.50	90,000	5,100	600	40	400	10	1,000	100	—	—	—
"	11	9.30 A. M.	10.8	820.5	148	1.7	9.4	9.0	0.25	90,000	1,400	1,300	120	1,000	10	1,000	10	—	—	6.0
"	11	12.00 Noon.	10.5	787.5	148	1.9	—	—	0.25	140,000	1,700	700	90	300	0	100	100	—	—	—
"	11	3.15 P. M.	10.9	754.5	157	2.2	—	—	0.40	100,000	1,500	5,300	70	2,400	0	—	—	—	—	—
"	12	9.30 A. M.	10.3	886.6	157	1.8	9.0	8.0	0.30	80,000	1,500	900	60	200	0	—	—	—	—	8.5
"	12	12.00 Noon.	10.6	820.5	153	1.9	—	—	0.50	100,000	1,400	1,200	50	800	0	1,000	100	—	—	—
"	12	3.15 P. M.	—	—	—	—	—	—	—	90,000	1,000	500	40	200	0	1,000	100	—	—	—
"	13	9.30 A. M.	10.3	820.5	150	1.9	9.2	9.6	0.50	20,000	300	400	80	100	0	100	100	1,000	100	9.0
"	13	12.00 Noon.	10.5	724.6	140	2.0	—	—	0.55	30,000	1,300	600	30	200	0	100	100	1,000	100	—
"	13	3.15 P. M.	—	—	—	—	—	—	—	20,000	600	300	100	100	0	—	—	—	—	—
"	14	9.30 A. M.	10.3	820.5	130	1.5	9.0	9.0	0.25	30,000	800	400	70	200	0	100	100	100	100	10.0
"	14	12.00 Noon.	—	—	—	—	—	—	—	60,000	1,500	*	30	—	0	100	100	10,000	10	—
"	16	3.15 P. M.	10.2	694.7	153	1.6	—	—	0.06	90,000	900	1,000	30	600	0	100	1,000	1,000	10	—
"	17	9.30 A. M.	10.3	754.5	152	1.8	9.2	9.4	0.35	100,000	3,100	1,200	90	800	40	10,000	100	1,000	1,000	9.0
"	17	12.00 Noon.	10.5	754.5	123	1.8	—	—	0.35	150,000	1,500	1,600	80	1,300	20	1,000	100	1,000	1,000	—
"	17	3.15 P. M.	11.1	664.8	131	2.2	—	—	0.35	100,000	1,000	1,000	50	300	10	—	—	—	—	—
"	18	9.30 A. M.	10.2	754.5	131	1.8	9.4	9.3	0.25	100,000	800	1,000	90	400	10	—	—	—	—	—
"	18	12.00 Noon.	10.5	754.5	135	1.8	—	—	0.25	120,000	1,600	1,800	80	800	10	10,000	100	1,000	100	—
"	18	3.15 P. M.	11.1	608.1	132	2.4	—	—	0.40	120,000	400	1,200	60	400	0	10	100	1,000	10	—
"	19	9.30 A. M.	10.8	634.9	135	2.2	9.6	9.2	0.45	60,000	800	500	60	300	0	1,000	100	1,000	100	10.0
"	19	12.00 Noon.	10.5	694.7	135	2.0	—	—	0.30	80,000	800	1,500	40	800	0	—	—	—	—	—
"	19	3.15 P. M.	11.0	694.7	130	2.0	—	—	0.35	90,000	1,000	1,000	200	200	80	1,000	10	1,000	100	—
"	20	9.30 A. M.	10.3	694.7	134	2.0	9.0	10.0	0.65	90,000	1,300	400	60	100	10	—	—	—	—	9.5
"	20	12.00 Noon.	10.2	664.8	144	2.2	—	—	0.60	180,000	1,000	1,100	80	200	0	1,000	10	100	1,000	—
"	21	9.30 A. M.	10.3	754.5	145	2.0	9.4	8.7	0.75	300,000	1,000	*	110	—	0	10	100	100	100	8.5
"	21	12.00 Noon.	10.0	787.5	143	1.8	—	—	0.20	90,000	3,000	800	100	600	30	1,000	100	—	—	—
"	22	9.30 A. M.	10.1	634.9	120	2.0	9.2	—	0.40	280,000	500	*	50	—	0	—	—	—	—	10.0
"	22	12.00 Noon.	10.1	664.8	131	2.0	—	—	0.15	60,000	2,600	1,300	30	900	0	100	1	—	—	—
"	22	3.15 P. M.	10.6	664.8	118	1.9	—	—	0.12	100,000	2,500	900	90	500	0	1,000	10	—	—	—
"	24	9.30 A. M.	10.3	754.5	110	1.5	7.4	8.0	0.90	110,000	2,400	1,200	40	1,700	0	100	1,000	—	—	10.0
"	24	12.00 Noon.	10.1	694.7	110	1.6	—	—	0.95	950,000	3,800	2,500	*	1,300	0	100	100	—	—	—
"	24	3.15 P. M.	—	—	—	—	—	—	—	100,000	1,600	400	1,200	300	900	—	—	—	—	—
"	25	9.30 A. M.	10.1	694.7	128	1.8	9.0	8.2	0.60	80,000	1,500	1,600	120	1,000	0	100	100	1,000	100	—
"	25	3.15 P. M.	10.6	608.1	138	2.4	—	—	0.60	150,000	1,300	1,900	90	900	0	1,000	10	1,000	1,000	—
"	26	9.30 A. M.	10.0	634.9	132	2.1	—	9.0	0.00	—	—	2,500	90	2,000	10	—	—	—	—	10.0
"	26	12.00 Noon.	—	—	—	—	—	—	—	120,000	4,000	4,000	50	3,000	0	1,000	100	1,000	100	—
"	26	3.15 P. M.	10.7	554.4	169	2.1	—	—	0.50	400,000	1,000	—	—	—	—	1,000	1,000	100	10	—
"	27	9.30 A. M.	10.3	694.7	175	2.0	6.6	8.1	0.60	140,000	1,900	700	70	500	0	100	10	1,000	1,000	12.0
"	27	12.00 Noon.	10.7	608.1	145	2.3	—	—	0.45	70,000	1,500	800	50	400	0	1,000	10	100	100	—
"	27	3.15 P. M.	10.6	581.2	158	2.6	—	—	0.38	130,000	2,100	500	60	100	0	—	—	—	—	—
"	28	9.30 A. M.	10.1	754.5	137	1.8	7.6	8.3	0.15	100,000	900	6,900	150	4,600	0	1,000	1	10,000	100	12.5
"	28	12.00 Noon.	10.2	787.5	114	1.5	—	—	0.10	90,000	1,200	7,700	170	4,700	20	1,000	100	1,000	1,000	—
"	30	9.30 A. M.	10.0	820.0	116	1.2	7.0	8.9	0.25	100,000	2,100	11,200	120	4,400	0	—	—	—	—	11.0
"	30	12.00 Noon.	10.1	820.5	118	1.4	—	—	0.00	220,000	4,000	18,300	200	6,900	0	10,000	1,000	1,000	100	—
"	30	3.15 P. M.	10.1	820.5	118	1.4	—	—	0.00	140,000	4,800	15,600	1,040	6,400	80	10,000	10	10,000	1,000	—
"	31	9.30 A. M.	10.0	886.6	117	1.3	9.2	9.6	0.20	100,000	2,000	9,500	100	2,000	10	10	10	100	100	11.0
"	31	12.00 Noon.	10.1	820.5	119	1.5	—	—	0.00	100,000	2,900	5,200	130	3,300	50	1,000	100	10,000	10	—
"	31	3.15 P. M.	10.2	787.5	126	1.6	—	—	0.35	900,000	700	1,000	30	300	10	—	—	—	—	—
April	1	9.30 A. M.	9.9	886.6	126	1.4	9.0	8.9	0.50	90,000	1,200	5,100	20	2,400	0	100	1	1,000	100	11.0
"	1	12.00 Noon.	10.1	820.5	142	1.7	—	—	0.05	80,000	1,300	2,300	60	2,000	0	—	—	—	—	—
"	1	3.15 P. M.	10.1	664.8	153	2.3	—	—	0.80	100,000	1,600	900	30	500	0	100	1	1,000	10	—
"	2	9.30 A. M.	9.8	820.5	154	1.8	8.8	9.3	0.30	50,000	1,000	1,100	50	50	0	—	—	—	—	11.0
"	2	12.00 Noon.	10.1	754.5	160	2.0	—	—	0.45	100,000	1,300	300	30	500	0	1,000	1,000	10,000	100	—
"	2	3.15 P. M.	10.1	754.5	146	1.9	—	—	0.50	130,000	800	300	40	100	0	1,000	100	1,000	100	—
"	3	9.30 A. M.	9.7	754.5	143	1.8	8.8	9.8	0.55	290,000	900	500	50	100	0	—	—	—	—	9.0
"	3	12.00 Noon.	10.0	694.7	166	2.2	—	—	0.55	130,000	1,800	2,300	120	1,800	0	1,000	100	10,000	10	—
"	3	3.15 P. M.	10.0	724.6	169	2.2	—	—	0.70	120,000	1,000	900	40	200	0	100	100	100	100	—
"	4	9.30 A. M.	—	—	—	—	—	—	—	80,000	1,300	2,100	40	1,300	10	10	100	100	10	—
"	4	12.00 Noon.	9.8	754.5	161	2.3	—	—	0.65	110,000	1,500	1,000	80	700	0	1,000	10	—	—	9.0
"	6	9.30 A. M.	9.5	754.5	150	1.9	8.0	7.6	0.80	140,000	1,100	600	90	100	0	—	—	—	—	11.5
"	6	12.00 Noon.	10.4	754.5	158	2.1	—	—	0.25	120,000	1,000	1,100	80	600	0	1,000	10	10,000	100	—
"	6	3.15 P. M.	—	—	—	—	—	—	—	120,000	1,400	300	70	100	0	1,000	10	1,000	100	—
"	7	9.30 A. M.	10.3	754.5	163	2.2	—	—	0.50	100,000	1,200	600	100	100	0	100	100	1,000	10	12.0
"	7	12.00 Noon.	10.5	754.5	198	2.7	—	—	0.70	100,000	900	3,000	*	300	0	—	—	—	—	—
"	7	3.15 P. M.	10.5	754.5	216	3.0	—	—	1.20	100,000	1,200	†	†	†	†	100	1	1,000	1	—
"	8	9.30 A. M.	10.3	754.5	211	2.9	8.2	8.5	1.00	100,000	600	1,000	60	300	0	—	—	—	—	13.5
"	8	12.00 Noon.	10.4	754.5	211	2.9	—	—	0.85	100,000	1,200	1,500	50	300	0	10,000	100	1,000	1,000	—
"	8	3.15 P. M.	10.4	754.5	203	2.8	—	—	1.70	120,000	700	—	—	—	—	1,000	10	100	100	—
"	9	9.30 A. M.	10.1	754.5	197	3.6	8.2	8.5	0.85	280,000	600	2,000	30	1,700	0	1,000	1	1,000	10	14.0
"	9	12.00 Noon.	10.5	820.5	209	2.5	—	—	1.00	350,000	900	5,700	30	4,700	0	100	10	1,000	10	—
"	9	3.15 P. M.	10.5	754.5	200	2.6	—	—	1.30	90,000	1,100	800	1	300	—	—	—	—	—	—
"	10	9.30 A. M.	10.1	754.5	190	2.6	7.2	—	1.70	170,000	1,300	3,300	90	2,700	0	—	—	—	—	12.0
"	10	12.00 Noon.	—	—	—	—	—	—	—	150,000	1,000	2,500	80	2,300	0	100	10	1,000	100	—
"	10	3.15 P. M.	10.3	754.5	200	2.7	—	—	1.20	120,000	1,600	800	20	700	0	100	1	100	100	—
"	12	9.30 A. M.	10.3	754.5	193	2.6	8.4	7.8	1.20	90,000	900	10,000	180	8,000	0	1,000	10	10,000	100	12.5
"	12	12.00 Noon.	10.1	886.6	228	2.5	—	—	1.00	150,000	7,300	8,500	70	6,300	10	1,000	10	10,000	10	—
"	13	9.30 A. M.	10.0	1,032.0	217	2.1	8.0	8.4	0.90	200,000	1,100	3,400	80	2,800	0	—	—	—	—	13.0
"	13	12.00 Noon.	10.2	1,072.0	208	1.9	—	—	0.32	70,000	4,200	1,000	40	200	0	—	—	—	—	—
"	13	3.15 P. M.	10.3	1,111.0	192	1.8	—	—	0.25	70,000	1,200	2,600	150	1,100	0	—	—	—	—	—
"	14	9.30 A. M.	10.1	886.6	188	2.1	7.2	8.1	0.10	170,000	1,800	2,400	50	1,000	0	100	100	1,000	100	11.0
"	14																			
"	14	3.15 P. M.	10.4	959.2	181	1.3	—	—	0.00	60,000	900	1,300	80	500	0	1,000	100	10,000	100	—
"	15	9.30 A. M.	10.0	886.6	207	2.8	6.0	8.1	0.72	140,000	700	7,800	80	6,300	0	—	—	—	—	12.0
"	15	12.00 Noon.	10.2	886.6	216	2.5	—	—	0.70	130,000	1,300	8,300	100	6,400	20	1,000	100	1,000	1,000	—
"	15	3.15 P. M.	—	—	—	—	—	—	—	90,000	2,300	3,400	110	2,400	0	10,000	1	1,000	100	—
"	16	9.30 A. M.	10.4	886.6	212	2.4	6.6	9.1	1.00	130,000	1,000	16,800	110	11,100	10	10,000	10	1,000	100	12.0
"	16	12.00 Noon.	—	—	—	—	—	—	1.10	100,000	1,000	—	—	—	—	1,000	10	1,000	100	—
"	16	3.30 P. M.	—	—	—	—	—	—	1.30	120,000	600	1,200	60	3,900	0	—	—	—	—	—
"	18	9.30 A. M.	10.1	959.2	208	2.2	8.2	7.2	0.40	150,000	3,800	3,000	170	2,000	0	10,000	100	1,000	1,000	12.0
"	18	12.00 Noon.	10.3	959.2	220	2.3	—	—	0.12	160,000	17,500	10,400	200	7,200	200	10,000	1	1,000	100	—
"	20	9.30 A. M.	10.2	959.2	212	2.3	8.0	—	0.50	110,000	1,000	8,400	90	4,600	0	—	—	—	—	12.0
"	20	12.00 Noon.	10.1	959.2	212	2.2	—	—	0.10	140,000	2,200	17,500	70	9,600	0	10,000	10	1,000	1,000	—
"	20	3.15 P. M.	10.0	959.2	212	2.3	—	—	0.90	100,000	4,000	14,000	3,200	19,700	1,300	100	100	10,000	1,000	—
"	21	9.30 A. M.	10.1	820.5	234	2.7	8.0	—	0.70	70,000	1,100	3,800	80	1,900	0	—	—	—	—	13.5
"	21	12.00 Noon.	10.1	922.0	224	2.4	—	—	0.00	120,000	1,200	45,000	120	40,000	0	1,000	10	1,000	100	—
"	22	9.30 A. M.	10.1	1,111.0	276	2.5	—	—	0.50	120,000	1,200	6,000	100	4,400	0	1,000	100	10,000	10	13.5
"	22	12.00 Noon.	10.1	1,111.0	280	2.5	—	—	0.13	130,000	1,500	6,500	40	4,500	0	—	—	—	—	—
"	23	9.30 A. M.	10.0	1,032.0	260	2.5	—	—	0.30	100,000	1,700	2,200	80	2,300	0	1,000	100	10,000	1,000	14.0
"	23	12.00 Noon.	10.0	1,032.0	257	2.5	—	—	0.45	100,000	2,000	2,800	120	2,000	0	1,000	1,000	1,000	100	—
"	24	9.30 A. M.	10.1	959.2	247	2.6	—	—	1.25	100,000	1,000	600	110	400	10	—	—	—	—	14.0
"	24	12.00 Noon.	10.1	959.2	262	2.9	—	—	0.25	—	—	—	—	—	—	1,000	100	1,000	100	—
"	25	9.30 A. M.	—	—	—	—	—	—	—	90,000	1,300	1,800	120	1,000	0	—	—	—	—	14.5
"	25	12.00 Noon.	—	—	—	—	—	—	—	110,000	5,200	3,200	140	1,700	0	—	—	—	—	—
"	27	9.30 A. M.	8.2	886.6	251	2.6	—	—	0.95	300,000	1,300	5,500	90	4,500	0	1,000	10	10,000	100	15.0
"	27	12.00 Noon.	10.1	886.6	274	3.1	—	—	1.00	70,000	800	2,300	90	2,100	0	—	—	—	—	—
"	27	3.15 P. M.	10.2	886.6	310	3.6	—	—	0.70	120,000	†	1,300	120	200	0	10	100	100	100	—
"	28	9.30 A. M.	10.3	1,111.0	322	3.0	6.0	7.4	0.85	150,000	1,400	1,500	80	1,100	0	—	—	—	—	15.5
"	28	12.00 Noon.	10.3	1,111.0	330	3.0	—	—	0.50	210,000	2,200	12,000	140	8,900	20	10,000	10	10,000	100	—
"	28	3.15 P. M.	10.3	1,111.0	310	2.9	—	—	0.75	100,000	1,200	†	†	†	—	1,000	1	100	10	—
"	29	9.30 A. M.	10.3	959.2	286	3.1	6.4	7.3	1.00	50,000	1,000	200	130	100	0	—	—	—	—	14.0
"	29	12.00 Noon.	10.1	959.2	300	3.1	—	—	0.30	180,000	1,400	3,000	120	2,300	0	10	1	10	10	—
"	29	3.15 P. M.	10.2	959.2	290	3.1	—	—	0.70	100,000	1,300	300	80	100	0	100	1	100	10	—
"	30	9.30 A. M.	10.3	754.5	282	3.8	6.8	7.2	1.20	120,000	700	100	40	100	0	100	1	100	10	15.0
"	30	12.00 Noon.	10.3	1,032.0	284	2.8	—	—	0.25	160,000	350	1,000	800	700	0	1,000	1,000	1,000	100	—
"	30	3.15 P. M.	—	—	—	—	—	—	—	90,000	1,100	5,500	100	3,800	10	—	—	—	—	—
May	1	9.30 A. M.	—	—	—	—	6.0	10.1	3.80	120,000	300	2,300	100	1,300	0	—	—	—	—	13.5
"	1	12.00 Noon.	—	—	—	—	—	—	—	180,000	1,900	7,800	130	2,000	0	100	10	10,000	10	—
"	1	3.15 P. M.	—	—	—	—	—	—	—	100,000	1,000	1,500	40	200	0	100	100	1,000	10	—
"	2	9.30 A. M.	10.1	820.5	278	3.4	7.6	8.6	1.10	150,000	1,500	2,200	70	1,300	0	—	—	—	—	13.0
"	2	12.00 Noon.	10.4	922.0	240	2.7	—	—	0.75	60,000	1,200	8,000	90	7,000	0	—	—	—	—	—
"	4	9.30 A. M.	10.1	634.9	229	3.6	7.2	7.9	1.50	180,000	1,500	800	100	0	0	100	10	10	100	13.0
"	4	12.00 Noon.	10.2	634.9	210	3.3	—	—	1.50	140,000	2,100	1,000	40	700	0	—	—	—	—	—
"	4	3.15 P. M.	10.3	263.4	105	2.0	—	—	0.40	120,000	1,400	3,400	110	2,500	0	1,000	100	1,000	100	—
"	5	9.30 A. M.	10.1	1,032.0	196	1.9	6.8	7.6	0.30	110,000	4,300	3,300	60	1,700	0	—	—	—	—	13.0
"	5	12.00 Noon.	10.2	1,032.0	210	2.1	—	—	0.10	300,000	4,000	2,800	100	5,400	40	10,000	10	10,000	10	—
"	5	3.15 P. M.	10.3	1,032.0	226	2.2	—	—	0.40	210,000	4,000	2,200	70	1,400	20	1,000	10	1,000	100	—
"	6	9.30 A. M.	10.1	820.5	228	2.7	—	—	0.80	110,000	1,200	6,000	30	0	0	10	10	100	10	13.5
"	6	12.00 Noon.	10.2	754.5	244	3.2	—	—	1.30	150,000	1,800	400	60	200	0	—	—	—	—	—
"	6	3.15 P. M.	10.2	754.5	248	3.2	—	—	1.65	170,000	2,000	—	70	—	0	1,000	10	100	1	—
"	7	9.30 A. M.	10.1	1,111.0	250	2.3	—	—	2.20	190,000	1,000	100	40	0	0	100	1	10	1	13.5
"	7	12.00 Noon.	10.2	905.4	262	2.7	—	—	1.28	130,000	1,400	1,200	70	600	30	1,000	100	1,000	1	—
"	7	3.15 P. M.	10.3	754.5	308	3.6	—	—	1.13	120,000	1,800	†	†	†	—	—	—	—	—	—

*Overgrown. †Liquefied. ‡Contaminated.

TABLE No. 2

RESULTS OF DISINFECTION OF SPRINKLING FILTER EFFLUENTS

10½ Foot Bed. ½ to 1½ Inch Stone

Period Covered 1908		Parts per Million		Bacteria per C. C.						B. Coli per C. C.		
				Gelatine		Agar Total		Acid Formers		Lactose Bile		
Date	Hour	Available Chlorine	Residual Chlorine	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Temp. of Effluent C°
June 5	11.00 A. M.	2.7	0.50	180,000	30,000	50,000	4,000	50,000	0			19.5
“ 5	3.15 P. M.	2.3	0.40	100,000	160,000	50,000	25,000	10,000	8,000	1,000	10	
“ 6	11.00 A. M.	2.3	0.25	150,000	10,000					1,000	100	18.0
“ 8	3.15 P. M.	2.2	0.20	90,000	1,000	30,000	3,000	10,000	0	100	100	19.2
“ 9	11.00 A. M.	2.0	0.20	90,000	9,000		3,000		0			19.0
“ 9	3.15 P. M.	2.1	0.15	120,000	15,000	50,000	700	20,000	0	1,000	100	
“ 10	11.00 A. M.	1.9	0.25	100,000	40,000	3,500	200	1,200	0	700	100	
“ 10	3.15 P. M.	2.1	0.25				800		0			
“ 11	11.00 A. M.	2.3	0.70	90,000	1,400	3,100	60	1,000	0			19.0
“ 11	3.15 P. M.	2.4	0.60			120,000	1,200	1,000	0			
“ 12	11.00 A. M.	2.6	0.75	140,000	1,200	5,000	90	1,700	0			18.5
“ 12	3.15 P. M.	2.6	0.80	70,000	200					1,000	100	
“ 13	11.00 A. M.	2.1	0.75	140,000	900	1,200	10	200	0	100	100	18.5
“ 15	11.00 A. M.	2.5	0.85	60,000	800	1,000	150	100	0			20.0
“ 15	3.15 P. M.	2.6	0.87	80,000	700	900	210	0	0			
“ 16	11.00 A. M.	1.9	0.70	110,000	100	1,100	450	400	0	1,000	10	18.0
“ 16	3.15 P. M.	2.0	0.50	70,000	120	1,000	220	300	0			
“ 17	11.00 A. M.	2.4	0.70	120,000	700	2,800	300	1,300	0			19.5
“ 17	3.15 P. M.	2.0	0.75	30,000	500	1,100	500	0	0	100	1,000	
“ 18	11.00 A. M.	2.1	0.30	150,000	1,300	2,500	300	200	0			19.0
“ 18	3.15 P. M.	2.2	0.65	90,000	3,100	1,000	900	0	180	10	100	
“ 19	11.00 A. M.	2.1	0.75	80,000	1,300	1,200	170	100	0	1,000	10	19.0
“ 19	3.15 P. M.	2.2	0.20	800,000	2,000							
“ 20	11.00 A. M.	2.2	0.45	100,000	2,100	3,000	510	300	0	1,000	1	21.0
“ 22	11.00 A. M.	2.2	0.15	130,000	4,200	7,200	210	200	0			22.0
“ 22	3.15 P. M.	1.9	0.00	260,000	5,400	1,000		200	0			
“ 23	11.00 A. M.	1.3	0.00	160,000	3,000	5,000	1,300	800	0			22.5
“ 23	3.15 P. M.	1.6	0.00	160,000	7,400	3,200	900	800	0	1,000	1,000	
“ 24	11.00 A. M.	1.4	0.00	210,000	2,300					100	100	22.0
“ 24	3.15 P. M.											
“ 25	11.00 A. M.	2.0	0.15	120,000	3,300	4,400	1,500	300	0			21.5
“ 25	3.15 P. M.	2.0	0.15		1,900	2,100	600	100	0			
“ 26	11.00 A. M.	2.0	0.15	140,000	1,900	1,700	1,400	100	0	1,000	100	21.0
“ 26	3.15 P. M.	2.1	0.15	220,000	2,400							
“ 27	11.00 A. M.	2.2	0.20	200,000	2,600							20.0
“ 28	11.00 A. M.	2.2	0.15	200,000	5,300		100	1,200	0	1,000	100	21.0
“ 28	3.15 P. M.	1.9	0.05	180,000	2,700							
“ 29	11.00 A. M.	1.5	0.15	140,000	4,100		480		0			21.5
“ 30	3.15 P. M.	1.6	0.15	140,000	2,200		900		20	100	100	
July 1	11.00 A. M.	1.9	0.40	180,000	2,400	3,000	410	300	0	10,000	10	21.5
“ 1	3.15 P. M.	2.0	0.15	130,000	2,100							
“ 2	11.00 A. M.	1.8	0.15	150,000	2,000	9,800	900	3,300	500			
“ 2	3.15 P. M.	1.7	0.15	150,000	2,300	3,400	3,100	1,000	0			
“ 3	11.00 A. M.	2.0	0.10	300,000	12,300	6,400	300	2,700	0			
“ 3	3.15 P. M.	2.0	0.10	300,000	14,000	1,700	7,000	500	2,000	100	1,000	
“ 6	3.15 P. M.	1.9	0.00	140,000	1,000	30,000	240	5,000	10			
“ 7	11.00 A. M.	2.1	0.15	100,000	2,400	5,100	200	3,100	30			
“ 7	3.15 P. M.	2.0	0.10	100,000	1,000	10,000	410	5,000	0	1,000	1,000	
“ 8	11.00 A. M.			100,000	2,700		1,000	3,000	0	1,000	100	22.0
“ 8	3.15 P. M.	1.8	0.10	190,000	15,000		1,500	4,000	0			
“ 9	11.00 A. M.	2.3	0.25			2,000	400	2,000	20			21.0
“ 9	3.15 P. M.	1.7	0.05			9,000	300	7,000	0	10,000	100	
“ 10	11.00 A. M.	1.9	0.05			10,000	310	12,000	0	100	100	20.5
“ 10	3.15 P. M.	2.2	0.05			3,000	170	1,400	0			
“ 11	11.00 A. M.	1.9	0.05	110,000	3,000	7,000	410	6,000	0	1,000	1,000	21.0
August 10	11.00 A. M.	2.6	0.00	240,000	10,000	20,000	5,000	22,000	0			
“ 10	3.15 P. M.			180,000	20,000	35,000	10,000	20,000	0	1,000	10	
“ 11	11.00 A. M.	2.1	1.00		18,000	18,000	1,000	12,000	0	1,000	10	
“ 11	3.15 P. M.	2.1	0.80	210,000	12,000	8,000	400	3,000	0			
“ 12	11.00 A. M.	2.1	1.00			8,000	1,000	2,000	0			
“ 12	3.15 P. M.	2.5	0.50			5,000	400	1,000	0	1,000	100	
“ 13	11.00 A. M.											
“ 13	3.15 P. M.	1.6	0.09	100,000	9,000	11,000	700	0	0			
“ 14	11.00 A. M.	1.5	0.40	410,000		5,000	300	1,000	0			23.0
“ 14	3.15 P. M.	2.1	0.30	370,000	127,000	3,000	800	1,000	0	1,000	100	23.5
“ 16	11.00 A. M.	2.4	0.50	190,000	210,000	4,000	7,000	2,000	100	100	100	
“ 17	3.15 P. M.	2.3	0.25	90,000	11,000	40,000	400	10,000	100			23.0
“ 18	11.00 A. M.	2.4	0.15	190,000	3,000	4,000	300	4,000	0			
“ 18	3.15 P. M.	2.3	0.20	170,000	3,000	50,000	4,300	40,000	0	100	10	21.0
“ 19	11.00 A. M.	1.7	0.21	290,000	11,000	38,000	200	11,000	0	1,000	10	
“ 19	3.15 P. M.	1.8	0.00	100,000	35,000	6,000	400	2,000	0			24.0
“ 20	11.00 A. M.	2.1	0.70	160,000	70,000		2,000		0			
“ 20	3.15 P. M.	2.5	0.55	210,000	10,000		5,000		0			21.5
“ 21	11.00 A. M.	2.6	0.50	100,000	3,000	4,000	1,400	2,000	0			
“ 21	3.15 P. M.	2.0	0.00	100,000	3,200	3,000	800	1,000	0	100	100	22.0
“ 22	11.00 A. M.	1.2	0.00	150,000	3,000	11,000	1,300	4,000	300	100	100	21.0
“ 24	11.00 A. M.	1.6	0.05	100,000	3,000	15,000	2,300	8,000	0			
“ 24	3.15 P. M.	1.6	0.00	100,000	3,300	12,000	800	5,000	0	10,000	10	22.0
“ 25	11.00 A. M.	1.7	0.35	300,000	2,300	21,000	5,700	7,000	0	1,000	100	
“ 25	3.15 P. M.	1.6	0.10	800,000	7,300	30,000	900	6,000	0			21.0
“ 26	11.00 A. M.	1.2	0.30	250,000	1,000	37,000	1,000	5,000	0			
“ 26	3.15 P. M.	1.4	0.35	150,000	3,000	71,000	400	2,000	0	100	100	19.5
“ 27	11.00 A. M.	2.1	0.60	550,000	2,700	45,000	2,300	5,000	0			
“ 27	3.15 P. M.	2.4	0.70	800,000	1,400	70,000	1,300	4,000	0			20.0
“ 28	11.00 A. M.	2.4	0.65			20,000	800	4,000	100			
“ 28	3.15 P. M.	2.3	0.50			20,000	2,300	6,000	0	1,000	10	20.0
“ 29	11.00 A. M.	2.8	0.25	180,000	1,200	30,000	700	11,000	0	1,000	100	
“ 31	11.00 A. M.	1.4	0.00	280,000		12,000	5,800	17,000	2,100			
“ 31	3.15 P. M.	1.4	0.00	240,000		11,000	3,800	17,000	4,000	100	10	21.0
September 1	11.00 A. M.	1.9	0.00	300,000	3,000	70,000	1,000	11,000	300			
“ 1	3.15 P. M.	2.0	0.00	380,000		78,000	1,200	9,000	1,000			21.0
“ 2	11.00 A. M.	2.2	0.35	260,000	3,600	61,000	600	9,000	100			
“ 2	3.15 P. M.	2.3	0.00	280,000	4,300	25,000	1,300	4,000	0	1,000	10	21.0
“ 3	11.00 A. M.	5.0	0.65	220,000	1,700	24,000	1,600	3,000	0			
“ 5	3.15 P. M.	2.7	0.40	180,000	1,300	61,000	100	9,000	0			20.0
	11.00 A. M.	1.6	0.00	180,000	2,400	60,000	1,700	5,000				

7½ Foot Bed. 1 to 3 Inch Stone

Period Covered 1908		Parts per Million		Bacteria per C. C.						B. Coli per C. C.		
				Gelatine		Agar Total		Acid Formers		Lactose Bile		
Date	Hour	Available Chlorine	Residual Chlorine	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Temp. of Effluent C°
June 5	11.00 A. M.	1.5	0.00	600,000	80,000	130,000	79,000	110,000	68,000			19.5
“ 5	3.15 P. M.	1.6	0.00	670,000	150,000	170,000	8,000	110,000	0	10,000	10	
“ 6	11.00 A. M.	1.6	0.30	600,000	40,000	80,000	1,000	70,000	0	10,000	1,000	17.5
“ 8	3.15 P. M.	1.5	0.00	250,000	20,000	80,000	10,000	60,000	3,000	10,000	100	20.0
“ 9	11.00 A. M.	1.4	0.00	700,000	20,000	140,000	2,000	97,000	1,000			19.0
“ 9	3.15 P. M.	1.4	0.00	750,000	21,000	36,000	5,000	42,000	1,000	10,000	3,000	
“ 10	11.00 A. M.	1.5	0.00	440,000	15,000	70,000	1,000	60,000	0	100,000	100	
“ 10	3.15 P. M.	1.4	0.00			20,000		10,000				
“ 11	11.00 A. M.	1.6	0.00	670,000	37,000		400		0			19.0
“ 11	3.15 P. M.	1.0	0.00			55,000	5,000	24,000	0			
“ 12	11.00 A. M.	1.7	0.00	300,000	10,000	50,000	500	20,000	0			18.0
“ 12	3.15 P. M.	1.9	0.25	730,000	110,000					1,000	100	
“ 13	11.00 A. M.	1.6	0.10	800,000	10,000	77,000		30,000		100,000	100	19.0
“ 15	11.00 A. M.	1.6	0.00	400,000	40,000	120,000		250,000				20.0
“ 15	3.15 P. M.	1.6	0.00	100,000	17,000							
“ 16	11.00 A. M.	1.4	0.00	300,000	20,000	51,000	600	25,000	0	1,000	1,000	18.0
“ 16	3.15 P. M.	1.5	0.00	100,000	18,000		1,000		200			
“ 17	11.00 A. M.	1.7	0.00	400,000	24,000	75,000	400	60,000	0			19.0
“ 17	3.15 P. M.	1.8	0.00	190,000	8,000	220,000	300	30,000	0	10,000	100	
“ 18	11.00 A. M.	1.1	0.00	300,000	9,000	130,000	1,100	55,000	0			20.0
“ 18	3.15 P. M.	1.2	0.00	700,000	15,000	45,000	500	35,000	0	1,000	10	
“ 19	11.00 A. M.	1.9	0.00	700,000	12,000	65,000	800	19,000	0	1,000	100	19.0
“ 19	3.15 P. M.	1.7	0.00	700,000	9,000							
“ 20	11.00 A. M.	1.7	0.00	400,000	12,000	60,000	200	20,000	0	1,000	10	21.0
“ 22	11.00 A. M.	1.6	0.00	310,000	70,000	20,000	700	10,000	100			20.0
“ 22	3.15 P. M.	1.2	0.00	300,000	20,000	10,000	6,700	3,000	100			
“ 23	11.00 A. M.	1.0	0.00	380,000	20,000	21,700	600	6,900	100			23.0
“ 23	3.15 P. M.	1.1	0.00	290,000	16,000	7,000	500	7,000	0	1,000	100	
“ 24	11.00 A. M.	1.1	0.00	200,000	15,000					10,000	100	22.0
“ 24	3.15 P. M.											
“ 25	11.00 A. M.	1.7	0.00	520,000	18,000	30,000	1,700	14,000	0			21.0
“ 25	3.15 P. M.	1.2	0.00	260,000	19,000	42,000	9,900	11,000	200			
“ 26	11.00 A. M.	1.2	0.00	310,000	40,000	210,000	1,100	40,000	0	1,000	100	21.0
“ 26	3.15 P. M.	1.2	0.00	470,000	49,000							
“ 27	11.00 A. M.	1.3	0.00	300,000	19,000							20.5
“ 28	11.00 A. M.	1.5	0.00	520,000	40,000	120,000	700	25,000	500	10,000	10	21.0
“ 28	3.15 P. M.	1.4	0.00	120,000	25,000							
“ 29	11.00 A. M.	1.4	0.00	450,000	20,000	40,000	1,000	50,000	1,100			21.0
“ 30	3.15 P. M.	1.3	0.00	200,000	80,000		1,300		700	1,000	100	
July 1	11.00 A. M.	1.3	0.00	450,000	31,000	60,000	10,000	15,000	100	10,000	100	21.0
“ 1	3.15 P. M.	1.1	0.00	600,000	29,000							
“ 2	11.00 A. M.	1.1	0.00	450,000	45,000	50,000	2,000	41,000	2,000			
“ 2	3.15 P. M.	1.2	0.00	320,000	30,000	40,000	1,000	16,000	0			
“ 3	11.00 A. M.	1.1	0.00	1,410,000	118,000	75,000	1,300	30,000	500			
“ 3	3.15 P. M.	1.1	0.00	320,000	116,000	17,000	500	16,000	0	10,000	10,000	
“ 6	3.15 P. M.	1.1	0.00	500,000		240,000	4,300	40,000	2,400			
“ 7	11.00 A. M.	1.0	0.00	440,000	15,000	21,000	300	11,000	0			
“ 7	3.15 P. M.	1.0	0.00	340,000	18,000	30,000	4,000	10,000	0	1,000	100	
“ 8	11.00 A. M.			270,000	19,000	27,000	2,500	10,000	0	10,000	100	22.0
“ 8	3.15 P. M.	1.4	0.00	200,000	10,000		11,500	12,000	3,000			
“ 9	11.00 A. M.	1.7	0.10			17,000	600	8,000	0			21.0
“ 9	3.15 P. M.	1.3	0.40			7,000	900	900	0	1,000	10	
“ 10	11.00 A. M.	1.4	0.50			21,000	200	1,000	0	100	100	20.5
“ 10	3.15 P. M.	1.6	0.00				100		0			
“ 11	11.00 A. M.	1.5	0.00	270,000	12,000		100		100	100	100	21.0
August 10	11.00 A. M.	2.2	0.85	700,000	120,000	35,000	20,000	20,000	0			
“ 10	3.15 P. M.			270,000	160,000	90,000	15,000	12,000	0	1,000	10	
“ 11	11.00 A. M.	1.8	0.25	700,000	10,000	25,000	2,000	14,000	0	10,000	10	
“ 11	3.15 P. M.	1.9	0.25	650,000	17,000	12,000	500	8,000	0			
“ 12	11.00 A. M.	1.7	0.50			20,000	4,000	12,000	100			
“ 12	3.15 P. M.	2.0	0.25			7,000	200	7,000	0	1,000	100	
“ 13	11.00 A. M.		0.10									
“ 13	3.15 P. M.	1.6		110,000	26,000	3,000	300	1,000	100			
“ 14	11.00 A. M.	1.7	0.30	450,000	67,000	3,000	200	0	0			23.5
“ 14	3.15 P. M.	1.5	0.15	600,000	17,000	3,000	1,100	2,000	0	1,000	100	23.0
“ 16	11.00 A. M.	1.3	0.00	320,000	10,000	3,000	1,000	3,000	100	10,000	1,000	
“ 17	3.15 P. M.	1.5	0.00	250,000	27,000	12,000	300	3,000	300			23.5
“ 18	11.00 A. M.	2.0	0.00	410,000	16,000	16,000	2,000	12,000	0			
“ 18	3.15 P. M.	1.7	0.00	160,000	8,000	70,000	800	10,000	0	1,000	3,000	22.5
“ 19	11.00 A. M.	1.6	0.00	440,000	17,000	30,000	1,300	17,000	0	1,000	100	
“ 19	3.15 P. M.	1.0	0.00	240,000	19,000	12,000	700	8,000	0			24.0
“ 20	11.00 A. M.	2.1	0.00	240,000	3,000	11,000	1,200	11,000	0			
“ 20	3.15 P. M.	2.4	0.15	400,000	3,000	15,000	800	14,000	0			24.5
“ 21	11.00 A. M.	2.3	0.05	600,000	3,000	5,000	400	8,000	0			
“ 21	3.15 P. M.	2.0	0.15	300,000	25,000	44,000	1,000	7,000	0	10,000	100	23.5
“ 22	11.00 A. M.	1.0	0.00	510,000	25,000	10,000	2,100	4,000	1,200	10,000	10,000	22.0
“ 24	11.00 A. M.	1.2	0.00	300,000	10,000	18,000	1,100	37,000	100			
“ 24	3.15 P. M.	1.2	0.00	600,000	13,000	25,000	2,000	29,000	100	10,000	10,000	21.5
“ 25	11.00 A. M.	1.7	0.05	400,000	4,000	30,000	1,200	33,000	0	10,000	100	
“ 25	3.15 P. M.	1.7	0.00	300,000	10,000	71,000	3,000	25,000	2,400			21.0
“ 26	11.00 A. M.	1.3	0.30	250,000	2,000	51,000	3,000	9,000	500			
“ 26	3.15 P. M.	1.7	0.35	400,000	1,300	18,000	1,100	5,000	0	1,000	100	19.5
“ 27	11.00 A. M.	2.0	0.35	310,000	9,000	3,000	1,200	7,000	100			
“ 27	3.15 P. M.	1.9	0.16	110,000	1,400	30,000	3,000	12,000	500			20.0
“ 28	11.00 A. M.	2.2	0.25			11,000	1,000	1,000	0			
“ 28	3.15 P. M.	2.2	0.30			18,000	1,700	17,000	0	1,000	100	20.0
“ 29	11.00 A. M.	2.3	0.32	230,000	7,800	75,000	1,400	15,000	0	1,000	100	
“ 31	11.00 A. M.	1.3	0.00	250,000		170,000	5,100	42,000	1,100			
“ 31	3.15 P. M.	1.3	0.00	300,000		45,000	14,000	13,000	1,200	10,000	100	21.0
September 1	11.00 A. M.	1.6	0.00	600,000	19,000	61,000	31,000	11,000	200			
“ 1	3.15 P. M.	1.6	0.00	200,000	11,800	40,000	4,700	41,000	500			20.5
“ 2	11.00 A. M.	1.3	0.00	200,000	3,200	14,000	800	7,000	700			
“ 2	3.15 P. M.	1.8	0.00	250,000	8,100	93,000	2,100	15,000	200	1,000	100	21.0
“ 3	11.00 A. M.	2.0	0.10		3,800	20,000	3,000	17,000	400			
“ 5	3.15 P. M.	2.0	0.00	200,000	3,000	79,000	2,400	20,000	300			20.0

4½ Foot Bed. 1 to 3 Inch Stone

Period Covered 1908		Parts per Million		Bacteria per C. C.						B. Coli per C. C.		
				Gelatine		Agar Total		Acid Formers		Lactose Bile		
Date	Hour	Available Chlorine	Residual Chlorine	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Temp. of Effluent C°
June 5	11.00 A. M.	1.3	0.00	1,000,000	120,000	140,000	2,000	160,000	0			18.5
“ 5	3.15 P. M.	1.8	0.00	510,000	120,000	120,000	200,000	90,000	50,000	10,000	100	
“ 6	11.00 A. M.	1.6	0.00	780,000	120,000	70,000	10,000	60,000	0	10,000	1,000	17.0
“ 8	3.15 P. M.	1.5	0.00	240,000	25,000	30,000	60,000	30,000	50,000	100,000	10	20.0
“ 9	11.00 A. M.	1.6	0.00	590,000	96,000	200,000	3,000	170,000	0			19.0
“ 9	3.15 P. M.	1.7	0.00	710,000	26,000	51,000		36,000		100,000	10	
“ 10	11.00 A. M.	1.3	0.00	670,000	107,000	140,000	2,000	80,000	0	10,000	10	
“ 10	3.15 P. M.	1.6	0.00			90,000	1,000	40,000	0			
“ 11	11.00 A. M.	1.6	0.00	130,000	19,000	130,000	500	100,000	300			19.0
“ 11	3.15 P. M.	1.7	0.00			130,000	81,000	100,000	50,000			
“ 12	11.00 A. M.	1.8	0.00	3,100,000	33,000	100,000	400	60,000	100			18.5
“ 12	3.15 P. M.	1.9	0.20	110,000	48,000					100	1,000	
“ 13	11.00 A. M.	1.6	0.10	180,000	40,000		12,000		1,000	1,000	1	18.5
“ 15	11.00 A. M.	1.7	0.00	490,000	39,000	30,000	1,000	50,000	0			20.0
“ 15	3.15 P. M.	1.5	0.00	110,000	14,000	30,000	1,000	10,000	0			
“ 16	11.00 A. M.	1.1	0.00		34,000	70,000	1,300	20,000	500	10,000	100	18.0
“ 16	3.15 P. M.	1.4	0.00	180,000	47,000	80,000	700	60,000	0			
“ 17	11.00 A. M.	1.5	0.00	300,000	11,000	60,000	600	60,000	0			19.0
“ 17	3.15 P. M.	2.0	0.20	180,000	12,000	50,000	700	0	100	1,000	100	
“ 18	11.00 A. M.	1.8	0.00	410,000	8,000	60,000	800	20,000	700			19.0
“ 18	3.15 P. M.	1.7	0.00	310,000	12,000	50,000	800	22,000	0	100,000	100	
“ 19	11.00 A. M.	2.0	0.00	790,000	50,000	80,000	600	80,000	0	100,000	100	19.0
“ 19	3.15 P. M.	1.7	0.10	130,000	7,000							
“ 20	11.00 A. M.	1.7	0.10	160,000	12,000	45,000	700	40,000	0	1,000	10	21.0
“ 22	11.00 A. M.	1.1	0.00	230,000	31,000	41,000	200	21,000	0			22.5
“ 22	3.15 P. M.	1.4	0.00	160,000	30,000	8,000	700	3,000	0			
“ 23	11.00 A. M.	1.4	0.00	250,000	10,000	16,000	1,000	9,000	700			23.0
“ 23	3.15 P. M.	1.2	0.00	200,000	10,000	7,000	500	3,000	100	10,000	100	
“ 24	11.00 A. M.	1.1	0.00		10,000					1,000	1,000	22.0
“ 24	3.15 P. M.											
“ 25	11.00 A. M.	1.3	0.00	510,000	25,000	41,000	2,100	31,000	900			21.0
“ 25	3.15 P. M.	1.3	0.00	290,000	28,000	51,000	4,700	29,000	200			
“ 26	11.00 A. M.	1.3	0.00	290,000	61,000	78,000	1,400	68,000	300	1,000	100	21.0
“ 26	3.15 P. M.	1.2	0.00	750,000	31,000							
“ 27	11.00 A. M.	1.4	0.00	470,000	30,000							20.5
“ 28	11.00 A. M.	1.0	0.00	300,000	30,000	200,000	1,500	50,000	1,500	1,000	1,000	21.0
“ 28	3.15 P. M.	1.5	0.00	320,000	28,000							
“ 29	11.00 A. M.	1.1	0.00	310,000	200,000	80,000	11,000	10,000	9,500			21.0
“ 30	3.15 P. M.	1.3	0.00	720,000	76,000		1,000		400	1,000	100	
July 1	11.00 A. M.	1.0	0.00	420,000	45,000	92,000	2,100	21,000	1,200	10,000	100	21.0
“ 1	3.15 P. M.		0.00	460,000	105,000							
“ 2	11.00 A. M.	1.3	0.00	690,000	94,000	77,000	5,000	56,000	3,200			
“ 2	3.15 P. M.	1.4	0.00	320,000	90,000	60,000	1,000	47,000	400			
“ 3	11.00 A. M.	1.4	0.00	890,000	207,000	76,000	5,000	55,000	3,300			
“ 3	3.15 P. M.	1.3	0.00	1,250,000	95,000	90,000	5,000	15,000	200	100,000	100	
“ 6	3.15 P. M.	1.5		420,000		230,000	23,000	80,000	10,000			
“ 7	11.00 A. M.	1.4	0.00	860,000	100,000	59,000	2,100	43,000	1,200			
“ 7	3.15 P. M.	1.5	0.00	890,000	110,000	160,000	5,000	4,000	1,300	1,000	100	
“ 8	11.00 A. M.			290,000	38,000		6,400	27,000	1,400	10,000	1,000	22.0
“ 8	3.15 P. M.	1.4	0.00	200,000	94,000	200,000		11,000	0			
“ 9	11.00 A. M.	1.6	0.00			89,000	300	24,000	0			
“ 9	3.15 P. M.	1.3	0.00			34,000	600	18,000	0	10,000	10,000	20.5
“ 10	11.00 A. M.	2.3	0.00			65,000	2,000	60,000	1,700	100,000	1,000	20.5
“ 10	3.15 P. M.	1.5	0.00			24,000		18,000				
“ 11	11.00 A. M.	1.5	0.00	250,000	51,000		2,500		1,300	100	100	21.5
August 10	11.00 A. M.	2.1	0.25	500,000	180,000	70,000	22,000	50,000	0			
“ 10	3.15 P. M.			470,000	30,000	20,000	17,000	37,000	0	10,000	10	
“ 11	11.00 A. M.	1.7	0.15	1,070,000		19,000	3,000	16,000	400	1,000	1,000	
“ 11	3.15 P. M.	1.9	0.15	180,000	14,000	15,000	800	25,000	0			
“ 12	11.00 A. M.	1.7	0.10			14,000	500	24,000	0			
“ 12	3.15 P. M.	1.9	0.00			10,000	300	4,000	0	10,000	100	
“ 13	11.00 A. M.		0.00									
“ 13	3.15 P. M.	1.6		400,000	30,000	8,000	800	2,000	0			
“ 14	11.00 A. M.	1.7	0.10	700,000	69,000	12,000	5,000	1,000	0			23.5
“ 14	3.15 P. M.	1.5	0.25	520,000	44,000	6,000	600	1,000	0	1,000	100	21.0
“ 16	11.00 A. M.	2.6	0.15	250,000	10,000	19,000	1,500	9,000	0	1,000	100	
“ 17	3.15 P. M.	5.0	0.25	290,000	3,000	57,000	900	31,000	0			23.0
“ 18	11.00 A. M.	5.0	0.50	190,000	9,000	95,000	4,000	55,000	0			
“ 18	3.15 P. M.	3.3	0.30	380,000	9,000	31,000	400	57,000	0	1,000	100	22.5
“ 19	11.00 A. M.	2.7	0.00	300,000	3,100	200,000	2,400	80,000	0	10,000	100	
“ 19	3.15 P. M.	3.0	0.20	920,000	7,000	135,000	900	94,000	0			24.0
“ 20	11.00 A. M.	3.8	0.80	600,000	4,000	110,000	1,200	52,000	100			
“ 20	3.15 P. M.	3.9	1.20	610,000	3,100	80,000		30,000				23.0
“ 21	11.00 A. M.	4.2	1.30	600,000	2,200	37,000	3,000	24,000	0			
“ 21	3.15 P. M.	4.0	1.20	300,000	2,500	90,000	2,500	15,000	0	10	10	23.0
“ 22	11.00 A. M.	2.2	0.00	800,000	17,200		400		0	100	1,000	22.0
“ 24	11.00 A. M.	2.8	0.00	400,000	5,000	90,000	700	30,000	0			
“ 24	3.15 P. M.	2.8	0.75	110,000	10,000	32,000	1,100	71,000	100	10,000	10	21.5
“ 25	11.00 A. M.	3.0	0.85	790,000	4,000	75,000	1,000	41,000	0	100	10,000	
“ 25	3.15 P. M.	3.0	0.30	590,000	3,000	110,000	800	75,000	100			21.0
“ 26	11.00 A. M.	2.7	1.00	500,000	3,000	70,000	800	19,000	0			
“ 26	3.15 P. M.	3.0	1.30	590,000	1,300	40,000	3,000	8,000	0	10,000	10	19.5
“ 27	11.00 A. M.	3.6	1.10	350,000		80,000	1,000	20,000	100			
“ 27	3.15 P. M.	3.7	0.75	510,000	4,000	110,000	4,500	41,000	500			20.0
“ 28	11.00 A. M.	4.3	1.50			64,000	800	21,000	0			
“ 28	3.15 P. M.	4.5	1.45			90,000	1,800	20,000	0	10,000	10	20.0
“ 29	11.00 A. M.	4.4	1.50	500,000	1,700	100,000	800	90,000	0	10,000	10	
“ 31	11.00 A. M.	2.8	0.00			275,000	2,400	98,000	400			
“ 31	3.15 P. M.	2.8	0.00	200,000	13,500	208,000	1,000	63,000	300	1,000	1,000	21.0
September 1	11.00 A. M.	2.8	0.50	300,000	4,400		500		100			
“ 1	3.15 P. M.	2.0	0.30		6,000	130,000	600	20,000	100			21.0
“ 2	11.00 A. M.	4.1	1.15	230,000	4,500	212,000	500	90,000	0			
“ 2	3.15 P. M.	4.3	0.75	530,000	1,900	245,000		50,000		10,000	100	21.0
“ 3	11.00 A. M.	3.9	1.15	400,000	2,200	160,000	600	79,000	0			
“ 5	3.15 P. M.	4.1	0.75	210,000	1,800	150,000	900	11,000	0			20.0

"	12	3.45 P. M.	2.3	0.45			3,000	100	7,000	0	1,000	100		2.0	0.25			7,000	300	7,000	0	1,000	100		1.9	0.45			10,000	300	4,000	0	10,000	100	
"	13	11.00 A. M.													0.10											0.00									
"	13	3.15 P. M.	1.7	0.30	100,000	3,000	11,000	200	0	0				1.5		410,000	30,000	5,000	200	1,000	100				1.8	0.00	410,000	32,000	8,000	800	3,000	0			
"	14	11.00 A. M.	1.3	0.00	410,000		5,000	300	1,000	0			22.0	1.7	0.30	410,000	60,000	5,000	200	0	0			21.5	1.7	0.10	700,000	80,000	12,000	5,000	1,000	0			21.5
"	14	3.15 P. M.	2.1	0.30	330,000	121,000	3,000	400	1,000	0	1,000	100	21.5	1.6	0.15	600,000	45,000	1,500	1,100	2,000	0	1,000	100	21.0	3.5	1.15	570,000	44,000	6,000	600	1,000	0	1,000	100	21.0
"	15	11.00 A. M.	2.1	0.30	180,000	210,000	4,000	7,000	2,000	100	100	100		1.0	0.00	270,000	10,000	9,000	1,100	2,000	100	10,000	1,000		2.5	0.15	200,000	19,000	19,000	1,500	17,000	0	1,000	100	
"	17	3.15 P. M.	2.1	0.25	90,000	14,000	40,000	300	20,000	100			21.5	1.0	0.00	250,000	25,000	10,000	600	5,000	200			22.0	3.0	0.20	360,000	9,000	37,000	900	31,000	0			22.0
"	18	11.00 A. M.	2.4	0.45	100,000	3,000	4,000	300	4,000	0				2.9	0.00	140,000	15,000	15,000	9,000	16,000	0				3.0	0.00	300,000	8,000	25,000	4,000	35,000	0			
"	18	3.15 P. M.	2.1	0.25	170,000	3,000	16,000	1,000	30,000	0	100	10	22.0	1.7	0.00	160,000	8,000	70,000	900	30,000	0	1,000	1,000	22.5	3.5	0.00	300,000	9,000	51,000	400	37,000	0	1,000	100	22.5
"	19	11.00 A. M.	1.7	0.25	290,000	11,000	28,000	800	11,000	0	1,000	70		2.3	0.00	240,000	17,000	30,000	1,300	11,000	0	1,000	100		2.7	0.00	250,000	2,300	240,000	2,400	60,000	0	10,000	100	
"	19	3.15 P. M.	1.8	0.05	100,000	20,000	9,000	400	2,000	0			21.0	1.5	0.00	240,000	10,000	10,000	700	8,000	0			21.0	3.0	0.20	100,000	2,300	123,000	500	94,000	0			24.0
"	20	11.00 A. M.	2.4	0.70	100,000	80,000		2,000		0				2.1	0.00	310,000	3,300	61,000	1,300	11,000	0				3.8	0.80	550,000	6,300	110,000	1,200	32,000	100			
"	20	3.15 P. M.	2.0	0.52	210,000	10,000		3,000		0			22.5	2.1	0.15	320,000	7,000	45,000	800	14,000	0			21.5	3.9	1.20	610,000	3,600	80,000		20,000				19.0
"	21	11.00 A. M.	2.8	0.75	100,000	4,000	4,000	1,400	2,000	0				3.5	0.25	140,000	7,400	9,000	400	4,000	0				4.2	1.30	460,000	2,300	37,000	5,000	24,000	0			
"	21	3.15 P. M.	2.0	0.06	100,000	1,200	3,000	900	1,000	0	100	100	22.0	3.0	0.15	200,000	22,000	24,000	1,000	7,000	0	10,000	100	22.5	4.0	1.30	250,000	2,300	30,000	2,300	15,000	0	10	10	22.0
"	22	11.00 A. M.	1.0	0.00	100,000	3,000	11,000	1,500	4,000	200	100	100	21.0	4.0	0.00	340,000	25,000	10,000	2,100	4,000	1,000	10,000	10,000	22.0	2.2	0.00	820,000	17,200		400		0	100	1,000	22.0
"	24	11.00 A. M.	1.6	0.45	100,000	3,000	3,000	2,500	3,000	0				1.2	0.00	280,000	10,400	25,000	1,100	25,000	100				2.2	0.00	430,000	8,200	60,000	700	36,000	0			
"	24	3.15 P. M.	1.0	0.00	180,000	9,000	12,000	800	2,000	0	10,000	10	22.0	1.2	0.00	630,000	13,000	35,000	2,000	35,000	700	10,000	10,000	21.5	2.8	0.15	410,000	65,000	92,000	1,100	73,000	100	10,000	10	21.5
"	25	11.00 A. M.	1.7	0.15	300,000	2,000	21,000	5,700	7,000	0	1,000	100		1.7	0.00	350,000	8,000	80,000	1,200	32,000	0	10,000	100		3.0	0.85	700,000	8,000	75,000	1,000	41,000	0	100	10,000	
"	25	3.15 P. M.	1.0	0.10	800,000	7,000	30,000	900	3,000	0			21.0	1.9	0.00	130,000	10,000	75,000	4,000	27,000	2,400			21.0	3.0	0.30	600,000	3,000	110,000	800	73,000	100			21.0
"	26	11.00 A. M.	1.0	0.35	200,000	1,000	45,000	1,000	3,000	0				1.5	0.25	250,000	2,000	31,000	5,000	9,000	100				3.7	1.00	600,000	4,000	75,000	800	19,000	0			
"	26	3.15 P. M.	1.1	0.20	150,000	9,000	21,000	500	2,000	0	100	100	19.5	1.1	0.15	400,000	1,500	18,000	4,100	3,000	0	1,000	100	19.5	2.8	1.25	600,000	1,000	80,000	1,000	5,000	0	10,000	10	19.5
"	27	11.00 A. M.	2.1	0.00	100,000	2,200	45,000	2,300	3,000	0				2.0	0.35	310,000	8,400	20,000	3,300	7,000	100				3.0	1.10	750,000		30,000	1,000	23,000	100			
"	27	3.15 P. M.	2.1	0.16	900,000	3,000	20,000	1,200	4,000	0			20.0	1.9	0.40	110,000	4,100	30,000	3,000	12,000	300			20.0	2.7	0.75	510,000	4,000	110,000	4,200	11,000	500			20.0
"	28	11.00 A. M.	2.1	0.05			20,000	900	4,000	100				1.1	0.35			17,000	1,000	4,000	0				4.3	1.00			44,000	800	31,000	0			
"	28	3.15 P. M.	2.0	0.30			20,000	2,200	6,000	0	1,000	10	20.0	2.2	0.25			20,000	1,700	12,000	0	1,000	100	20.0	4.5	1.83			50,000	1,400	65,000	0	10,000	10	20.0
"	30	11.00 A. M.	2.0	0.20	100,000	3,000	20,000	700	11,000	0	7,000	100		2.3	0.22	220,000	2,800	73,000	1,000	15,000	0	1,000	100		4.4	1.30	300,000	1,100	140,000	900	89,000	0	10,000	10	
"	31	11.00 A. M.	1.4	0.00	200,000		47,000	5,000	17,000	3,100				1.3	0.00	310,000		100,000	5,700	32,000	1,000				2.8	0.00			275,000	2,400	186,000	100			
"	31	3.15 P. M.	1.4	0.00	240,000		11,000	3,000	17,000	1,000	100	10	21.0	1.4	0.00	160,000		45,000	14,000	13,000	1,200	10,000	100	21.0	2.8	0.15	350,000	13,300	208,000	1,000	65,000	200	1,000	1,000	22.0
September	1	11.00 A. M.	2.3	0.00	300,000	8,000	30,000	1,000	15,000	200				1.8	0.00	350,000	19,000	65,000	21,000	11,000	200				3.6	0.50	300,000	1,400		400		100			
"	1	3.15 P. M.	2.0	0.00	280,000		38,000	4,100	6,000	1,000			21.0	1.6	0.07	260,000	11,300	32,000	1,100	11,000	200			20.5	2.0	0.50		6,000	109,000	500	21,000	100			21.0
"	2	11.00 A. M.	2.2	0.30	200,000	2,000	61,000	600	9,000	100				1.3	0.02	280,000	4,200	34,000	900	5,000	200				4.1	1.15	250,000	4,300	213,000	500	60,000	0			
"	2	3.15 P. M.	2.3	0.00	380,000	4,000	25,000	1,500	4,000	0	1,000	10	21.0	1.8	0.07	250,000	8,400	52,000	2,100	15,000	200	1,000	100	21.0	4.2	0.75	350,000	2,300	245,000		50,000		10,000	100	21.0
"	3	11.00 A. M.	3.0	0.05	220,000	1,700	34,000	1,200	3,000	0				2.0	0.30		6,400	40,000	3,300	19,000	600				5.9	1.15	400,000	2,300	180,000	600	76,000	0			
"	3	3.15 P. M.	2.7	0.10	100,000	1,200	61,000	100	5,000	0			20.0	2.0	0.00	200,000	2,000	77,000	2,400	20,000	200			20.0	4.1	0.75	210,000	1,300	130,000	800	41,000	0			20.0
"	4	11.00 A. M.	1.6	0.00	180,000	2,000	47,000	1,100	5,000	200				1.6	0.04	200,000		218,000	13,000	10,000	6,700				2.8	0.00	310,000	19,200	310,000	2,400	175,000	1,700			
"	4	3.15 P. M.	1.5	0.00	190,000	4,000	19,000	1,000	4,000	100	1,000	10	20.0	1.0	0.00	230,000	20,700	67,000	7,000	51,000	7,300	1,000	100	20.5	2.7	0.35	310,000	11,700	186,000	800	82,000	600	1,000	10	20.5
October	5	11.00 A. M.	Began using lime—7 parts bleach and 1 part lime.																																
"	6	11.00 A. M.	2.4	0.25	470,000	80,000	207,000	7,000	15,000	1,000	10,000	400		1.4	0.00	600,000	340,000		37,000		17,000	10,000	1,000		2.8	0.00	300,000	110,000		9,000		2,000	10,000	1,000	
"	6	3.15 P. M.	2.2	0.10	400,000	800,000	120,000	40,000	40,000	1,000			17.5	1.3	0.00	1,000,000	780,000		37,000	140,000	9,000			17.0	2.8	0.00	1,000,000	400,000		4,000		0			18.0
"	9	11.00 A. M.	2.5	0.60	160,000	80,000	11,000	5,000	10,000	0	1,000	10		1.4	0.00	750,000	94,000	240,000	12,000	30,000	3,000	10,000	100		3.4	0.05	1,210,000	60,000	304,000	7,000	110,000	7,000	10,000	10	
"	9	3.15 P. M.	2.2	0.25	300,000	80,000	40,000	7,000	10,000	0			17.5	1.5	0.00	900,000	102,000	140,000	20,000	36,000	36,000			17.5	3.5	0.10	900,000	90,000	200,000	7,000	120,000	1,000			18.0
"	10	11.00 A. M.	2.8	0.50	800,000	180,000	45,000	10,000	24,000	0	10,000	10	17.5	1.0	0.00	950,000	130,000	200,000	14,000	118,000	2,000	1,000	1,000	17.5	3.5	0.25	1,250,000	160,000	104,000	8,000	64,000	4,000	10,000	100	17.5
"	13	11.00 A. M.	2.8	0.45	300,000	110,000	32,000	16,000	27,000	0				1.9	0.07	1,180,000	390,000	220,000	62,000	200,000	30,000				3.8	0.70	2,000,000	130,000		20,000		3,000			
"	13	3.15 P. M.	2.7	0.12	200,000	100,000	150,000	4,000	60,000	0	100,000	10	16.0	1.1	0.00	1,000,000	110,000	400,000	40,000	170,000	7,000	100,000	10,000	16.5	4.2	0.00	1,000,000	40,000	300,000	11,000	130,000	0	10,000	1,000	17.0
"	14	11.00 A. M.	3.1	0.00	150,000	140,000	134,000	14,000	60,000	0	1,000	10		1.5	0.00	710,000	160,000	240,000		170,000		10,000	1,000		4.3		730,000	80,000	500,000	17,000	120,000	2,000	100,000	100	
"	14	3.15 P. M.	2.9	0.00	700,000	70,000	175,000	9,000	52,000	1,000			16.0	1.5	0.00	1,250,000	480,000	35,000	40,000	40,000	40,000			16.5	3.9	0.00	1,210,000	300,000		10,000		8,000			17.0
"	15	11.00 A. M.	2.2	0.00	450,000	280,000	30,000	7,000	69,000	2,000				1.4	0.00	1,300,000	300,000	300,000	75,000	75,000	47,000				3.1	0.00	1,600,000	160,000	240,000	3,000	130,000	1,000			
"	15	3.15 P. M.	2.7	0.30	280,000	80,000	29,000	3,000	40,000	0			16.0	1.4	0.00	1,700,000	270,000	230,000	28,000	30,000	19,000			17.5	3.0	0.15	1,250,000	180,000	180,000	80,000	100,000	6,000			17.0
"	16	11.00 A. M.	2.3	0.00	600,000	120,000	110,000	4,000	60,000	0				1.5	0.00	2,700,000	10,000	230,000	36,000	117,000	31,000				2.4	0.00	1,750,000	110,000	200,000	5,000	140,000	0			
"	16	3.15 P. M.	2.3	0.00	470,000	40,000	70,000	5,000	74,000	0	1,000	10	18.0	1.4	0.00	1,200,000	270,000	100,000	41,000	100,000	12,000	1,000	1,000	18.0	3.2	0.00	1,170,000	80,000	251,000	3,000	120,000	1,000	1,000	1,000	17.5
"	17	11.00 A. M.	2.5	0.40	210,000	170,000	81,000	5,000	35,000	0	10,000	100	17.0	1.4	0.00	240,000	230,000	100,000	80,000	145,000	21,000	10,000	1,000	18.0	3.4	0.00	300,000	194,000	165,000	4,000	38,000	0	10,000	100	18.5
"	18	11.00 A. M.	1.9	0.00	340,000	70,000	40,000	7,000	31,000	0				1.3	0.00	1,000,000	610,000	120,000	44,000	44,000	44,000				2.9	0.00	1,100,000	300,000	410,000	6,000	200,000	0			
"	18	3.15 P. M.	1.8	0.00	380,000	100,000	20,000	3,000	10,000	0	1,000	100	17.0	1.3	0.00	2,350,000	250,000	7,000	5,000	2,000	0	1,000	1,000	18.0	3.1	0.00	1,700,000	100,000	25,000	15,000	20,000	0	1,000	100	18.0
"	20	11.00 A. M.	2.9	0.65	210,000	10,000	45,000	7,000	30,000	0	1,000	100		1.6	0.00	2,250,000	440,000	260,000	100,000	100,000	21,000	100,000	1,000		3.7	0.30	1,700,000	80,000	410,000	4,000	275,000	0	100,000	100	
"	20	3.15 P. M.	2.7	0.45	250,000	11,000	32,000	6,000	18,000	0			17.0	1.6	0.00	1,070,000	220,000	270,000	40,000	110,000	20,000			17.0	4.9	0.10	2,100,000	60,000	310,000	10,000	150,000	0			17.0
"	21	11.00 A. M.	2.0	0.50	200,000	8,000	30,000	8,500	21,000	1,200	100	10		1.7	0.00	800,000	250,000	200,000	36,000	90,000	25,000	10,000	10,000		2.0	0.00	840,000	10,000	450,000	50,000	300,000	25,000	100,000	1,000	
"	21	3.15 P. M.	2.8	0.65	210,000	17,000	48,000	800	61,000	200			17.0	1.7	0.00	620,000	170,000	300,000	40,000	160,000	10,000			17.0	2.0	0.00	700,000	10,000	360,000	1,100	220,000	3,000			17.0
"	22	11.00 A. M.	2.8	0.30	180,000	12,000	27,000	1,100	22,000	200				1.5	0.00	1,120,000	450,000	110,000	51,000	150,000	76,000				4.1	0.40	1,100,000		230,000	8,000	70,000	1,000			
"	22	3.15 P. M.	2.8	0.40			28,000	1,300	13,000	100			17.0	1.4	0.00			240,000	40,000	90,000	21,000			17.0	4.4	1.50			400,000	12,000	550,000	4,000			17.0
"	23	3.15 P. M.	3.0	0.10			45,000	4,100	10,000	0	10,000	1,000	17.5	1.4	0.00			300,000	75,000	100,000	13,000	100,000	10,000	19.0	4.0	0.45			500,000	45,000	80,000	0	1,000	100	15.0
"	24	11.00 A. M.	2.2	0.00	210,000		20,000	8,000	10,000	0	10,000	100		1.7	0.00	800,000		130,000	17,000	60,000	12,000	1,000	100		4.4	0.15	1,410,000	37,000	440,000	14,000	170,000	0	100,000	100	
"	25	11.00 A. M.	1.8	0.00	140,000	28,000	40,000	8,000	14,000	1,400				1.4	0.00	560,000	270,000	120,000	40,000	60,000	12,000				2.1	0.00	1,000,000	35,000		70,000		22,000			
"	26	3.15 P. M.	2.1	0.00	210,000	32,000	26,000	2,500	24,000	2,200	10,000	10,000		1.4	0.00	1,100,000	350,000	400,000	110,000	115,000	9,000	100,000	10,000		3.0	0.00	1,000,000	40,000		110,000		10,000	100,000	1,000	
"	27	3.15 P. M.	2.0	0.00	450,000	11,000	24,000	6,200	44,000	3,800	10,000	1,000	15.5	2.2	0.00	1,250,000	340,000	270,000	32,000	180,000	27,000	100,000	10,000	16.5	3.0	0.00	1,350,000	70,000	400,000	8,000	280,000	1,000	100,000	1,000	16.5
"	28	11.00 A. M.	2.2	0.20	300,000	26,000	20,000	600	12,000	100				1.3	0.00	1,350,000	300,000	620,000	34,000	220,000	25,000				3.0	0.00	1,300,000	70,000	400,000	8,000	280,000	1,000	100,000	1,000	16.5
"	28	3.15 P. M.	2.0	0.25	200,000	21,000	40,000	1,200	21,000	0	10,000	100	17.0	1.3	0.00	1,180,000	240,000	230,000	25,000	110,000	31,000	100,000	10,000	17.0	2.9	0.10	1,450,000	110,000	720,000	14,000	250,000	1,000	100,000	1,000	16.5
"	29	11.00 A. M.	2.2	0.15	1,040,000	60,000	33,000	4,500	20,000	1,000				1.4	0.00	1,280,000	160,000	240,000	25,000	110,000	46,000	100,000	10,000	17.0	3.5	0.40	1,050,000	40,000	320,000	2,000	140,000	0	100,000	100	17.0
"	29	3.15 P. M.	2.0	0.30	400,000	21,000	80,000	800	14,000	0			16.0	1.3	0.00	1,400,000	100,000	380,000	60,000	150,000	15,000			16.0	2.7	0.00	1,000,000	140,000	400,000	20,000	100,000	22,000			16.0
"	30	11.00 A. M.	1.8	0.30	150,000	60,000	75,000	20,000	7,000	1,400			16.0	1.1	0.00	1,100,000	100,000	280,000	60,000	150,000	18,000			16.0	2.5	0.00	900,000	170,000	430,000	29,000	330,000	1,000			16.0
"	30	3.15 P. M.	1.9	0.00	100,000	7,000	75,000	2,500	25,000	300	10,000	100	15.0	1.1	0.00	170,000	300,000	400,000	92,000	80,000	20,000				2.6	0.00	2,000,000	35,000	320,000	50,000	130,000	10,000			
"	31	11.00 A. M.	2.1	0.15	120,000	9,000	74,000	1,500	20,000	400	1,000	10	15.0	1.1	0.00	90,000	40,000	270,000	105,000	90,000	20,000	100,000	10,000	16.0	2.5	0.00	170,000	4,000	320,000	4,000	130,000	10,000	1,000	100	15.0
November	2		During apparatus out of order.													99,000	10,000	280,000	17,000	210,000	3,000	100,000	10,000	16.0	3.1	0.00	300,000	60,000	260,000	4,000	100,000	1,000	10,000	3,000	15.0
"	4	11.00 A. M.	1.1	0.00	790,000	200,000	330,000		60,000	0				1.9	0.00	440,000	230,000	100,000	150,000	70,000	100,000				1.7	0.00	750,000	100,000	540,000		250,000	40,000			
"	4	3.15 P. M.	2.5	0.00	170,000	160,000		100,000	50,000	0			16.0	1.8	0.00	740,000	100,000	330,000	480,000	90,000	40,000				3.3	0.00	540,000	300,000	440,000	170,000	210,000	40,000			
"	5	11.00 A. M.	1.7	0.00	250,000	32,000	360,000	15,000	40,000	1,000				2.0	0.00	450,000	170,000	240,000	80,000	210,000	10,000			16.0	3.4	0.00	180,000	60,000	430,000	200,000	330,000	10,000			16.0
"	5	3.15 P. M.	1.9	0.00	280,000	44,000	120,000		70,000	5,000	1,000	1,000	18.0	1.5	0.00	440,000	240,000	150,000	210,000	140,000	1,000	10,000		15.0	2.4	0.00	720,000	220,000	190,000	70,000	30,000	10,000	1,000	1,000	18.0
"	6	11.00 A. M.	3.0	0.20	450,000	31,000								2.0	0.00	460,000	70,000	150,000	11,000	60,000	4,000				3.4	0.00	720,000	62,000	700,000	8,000	100,000	4,000			
"	6	3.15 P. M.	2.4	0.45	170,000	16,000			20,000	0	1,000	10		2.0	0.00	680,000	120,000			40,000	40,000	10,000	1,000		3.9	0.15	450,000	20,000			20,000	2,000	1,000	10	
"	7	11.00 A. M.	2.0	0.25	210,000	31,000			20,000	1,000	10,000	10		1.8	0.00					10,000	8,000	10,000	1,000		3.0	0.40	1,000,000	70,000			20,000	1,000	10,000	10	
"	9		Filter not running.																																
"	10	11.00 A. M.	4.1	0.58	230,000	31,000	250,000	2,000	20,000	0				3.3	0.73	850,000	150,000	150,000	2,800	30,000	0				3.6	1.30	500,000	17,000	270,000		110,000	100			
"	10	3.15 P. M.	2.2	0.50	450,000	20,000	210,000	800	10,000	100	1,000	100	15.0	3.1	0.45	410,000	31,000	190,000	900	30,000	200	10,000	100	15.0	4.3	0.30	520,000	32,000	150,000	800	70,000	0	1,000	10	15.0
"	11	11.00 A. M.	2.4	0.35	400,000	25,000	80,000	600	10,000	0			14.0	3.1	0.30	780,000	40,000	140,000	800	170,000	0			14.0	4.1	1.30	1,260,000	65,000	270,000	500	120,000	0			14.0
"	12	11.00 A. M.	3.2	0.00			80,000	40,000	20,000	0			13.0	2.7	0.90			210,000	16,000	110,000	500			13.0	1.1	1.21			220,000	1,200	120,000	0			12.0
"	12	3.15 P. M.	Filter not running.																																
"	13	11.00 A. M.	Filter not running.																																
"	13	3.15 P. M.	2.4	0.00			80,000		20,000		10,000	1,000	13.0	2.2	0.00			200,000	30,000	150,000	15,000	10,000	10,000	13.0	3.0	0.50			150,000	700	10,000	200	10,000	100	13.0

TABLE No. 3

RESULTS OF DISINFECTION OF SPRINKLING FILTER EFFLUENTS

1908		6' BED 1" TO 3" STONE											8' BED 1" TO 3" STONE										
		PARTS PER MILLION		BACTERIA PER C. C.						B. COLI PER C. C.		Temp. of Effluent C°	PARTS PER MILLION		BACTERIA PER C. C.						B. COLI PER C. C.		Temp. of Effluent C°
				GELATINE		AGAR TOTAL		ACID FORMERS		LACTOSE BILE					GELATINE		AGAR TOTAL		ACID FORMERS		LACTOSE BILE		
DATE	HOUR	Available Chlorine	Residual Chlorine	Initial	Final	Initial	Final	Initial	Final	Initial	Final		Available Chlorine	Residual Chlorine	Initial	Final	Initial	Final	Initial	Final	Initial	Final	
July 12	3.15 P. M.	0.8	0.00	200,000	100,000	130,000	30,000	30,000	10,000	—	—	23.0	0.9	0.00	300,000	60,000	120,000	70,000	60,000	30,000	—	—	22.5
" 14	11.00 A. M.	0.8	0.00	190,000	*	120,000	4,000	90,000	0	—	—	22.0	1.1	0.00	400,000	170,000	110,000	7,000	10,000	3,000	—	—	22.0
" 14	3.15 P. M.	0.8	0.00	250,000	160,000	70,000	8,000	40,000	4,000	10,000	1,000		1.1	0.00	250,000	180,000	10,000	3,000	10,000	0	10,000	100	
" 15	11.00 A. M.	0.7	0.00	210,000	160,000	500,000	7,000	210,000	0	10,000	100	21.0	1.0	0.00	130,000	120,000	50,000	1,000	25,000	0	1,000	100	21.5
" 15	3.15 P. M.	1.0	0.00	190,000	160,000	100,000	9,000	280,000	12,000	—	—		1.3	0.00	140,000	50,000	60,000	2,000	10,000	2,000	—	—	
" 16	11.00 A. M.	1.1	0.00	210,000	40,000	70,000	7,000	30,000	1,000	—	—	20.0	1.5	0.00	180,000	50,000	20,000	6,000	10,000	1,000	—	—	20.0
" 16	3.15 P. M.	1.9	0.00	800,000	140,000	50,000	3,000	30,000	1,000	1,000	100		1.8	0.20	170,000	23,000	80,000	3,000	10,000	0	1,000	100	
" 17	11.00 A. M.	1.2	0.05	*	*	80,000	200	10,000	100	1,000	10	21.0	2.0	0.10	190,000	*	70,000	800	10,000	0	10,000	10	20.5
" 17	3.15 P. M.	1.1	0.05	240,000	22,000	60,000	400	20,000	100	—	—		1.5	0.10	100,000	*	9,000	400	1,000	0	—	—	
" 18	11.00 A. M.	1.1	0.00	*	16,000		—	—	—	—	—	21.0	1.2	0.00	210,000	21,000	—	—	—	—	—	—	21.0
" 20	11.00 A. M.	1.0	0.00	410,000	340,000	50,000	2,100	40,000	400	—	—	21.0	1.8	0.00	920,000	30,000	20,000	500	27,000	0	—	—	21.5
" 20	3.15 P. M.	1.0	0.00	1,200,000	78,000	40,000	1,000	40,000	100	—	—		1.9	0.00	1,140,000	22,000	40,000	300	31,000	0	—	—	
" 21	11.00 A. M.	1.2	0.00	140,000	142,000	70,000	2,400	70,000	1,200	1,000	100	22.0	1.1	0.00	1,240,000	12,000	10,000	400	17,000	0	1,000	10	22.0
" 21	3.15 P. M.	1.4	0.00	200,000	34,000	21,000	200	17,000	0	—	—		1.1	0.00	740,000	21,000	6,000	800	6,000	0	—	—	
" 22	11.00 A. M.	1.4	0.00	130,000	48,000	47,000	2,100	20,000	200	—	—	22.0	1.0	0.00	300,000	25,000	20,000	800	14,000	0	—	—	22.0
" 22	3.15 P. M.	1.4	0.00	320,000	73,000	56,000	700	45,000	400	10,000	100		1.0	0.00	670,000	21,000	50,000	1,400	8,000	0	1,000	10	
" 23	11.00 A. M.	1.4	0.00	110,000	61,000	85,000	2,000	31,000	1,000	—	—	22.0	1.0	0.00	300,000	30,000	50,000	800	1,000	0	—	—	22.5
" 23	3.15 P. M.	1.5	0.00	410,000	50,000	100,000	700	60,000	800	—	—		1.5	0.00	1,430,000	9,000	20,000	1,000	10,000	0	—	—	
" 24	11.00 A. M.	1.6	0.00	380,000	20,000	92,000	2,300	18,000	0	—	—	22.0	1.9	0.10	160,000	9,000	12,000	500	6,000	0	—	—	22.5
" 24	3.15 P. M.	1.5	0.00	640,000	19,000	—	—	—	—	1,000	100		1.8	0.10	210,000	17,000	—	—	—	—	1,000	1,000	
" 25	11.00 A. M.	1.7	0.00	310,000	50,000	16,000	3,200	9,000	1,000	1,000	1,000	23.5	1.4	0.00	400,000	13,000	6,000	1,300	4,000	200	10,000	100	22.5
" 27	11.00 A. M.	0.9	0.00	—	—	10,000	3,000	1,000	10,000	—	—	22.0	1.0	0.20	—	—	6,000	1,000	2,000	0	—	—	22.0
" 27	3.15 P. M.	1.1	0.00	—	—	—	—	—	—	1,000	100		1.4	0.20	—	—	—	—	—	—	1,000	10	
" 28	11.00 A. M.	1.1	0.00	370,000	60,000	11,000	5,000	700	200	—	—	22.0	1.8	0.10	490,000	25,000	10,000	300	3,000	100	—	—	22.0
" 28	3.15 P. M.	1.8	0.00	390,000	60,000	11,000	1,200	6,000	600	1,000	1,000		1.4	0.00	620,000	50,000	8,000	300	7,000	100	1,000	10	
" 29	11.00 A. M.	1.2	0.00	640,000	64,000	60,000	20,000	8,000	100	—	—	22.0	1.6	0.00	320,000	170,000	70,000	30,000	8,000	0	—	—	22.0
" 29	3.15 P. M.	1.5	0.00	800,000	73,000	16,000	15,000	7,000	1,600	—	—		1.4	0.00	710,000	24,000	50,000	6,000	2,000	0	—	—	
" 30	11.00 A. M.	Settling basins cleaned. Septic action apparent.																					
" 30	3.15 P. M.	1.0	0.00	220,000	25,000	140,000	11,000	21,000	300	10,000	1,000	22.0	1.6	0.30	120,000	29,000	120,000	400	7,000	200	1,000	100	22.5
" 31	11.00 A. M.	1.0	0.00	300,000	28,000	300,000	700	3,000	200	—	—	22.5	1.2	0.00	600,000	74,000	140,000	20,000	9,000	0	—	—	22.0
" 31	3.15 P. M.	1.0	0.00	250,000	39,000	30,000	1,000	2,000	0	1,000	1,000		1.2	0.00	340,000	1,700	30,000	2,000	6,000	0	100	100	
August 1	11.00 A. M.	1.5	0.00	600,000	25,000	116,000	2,100	41,000	600	1,000	100	22.0	1.8	0.70	190,000	22,000	—	—	—	—	100	100	23.0
" 3	11.00 A. M.	2.1	0.25	—	—	8,000	1,100	8,000	0	10,000	10	21.5	2.2	0.75	—	—	30,000	2,000	5,000	0	100	100	22.0
" 3	3.15 P. M.	2.0	0.15	210,000	10,000	—	300	—	0	—	—		2.4	0.75	110,000	16,000	16,000	1,000	0	0	—	—	
" 4	11.00 A. M.	0.9	0.00	280,000	182,000	16,000	19,000	15,000	0	—	—	21.5	1.3	0.00	400,000	30,000	50,000	2,400	1,000	100	—	—	23.0
" 4	3.15 P. M.	0.9	0.00	300,000	40,000	—	—	—	—	1,000	10		1.0	0.00	290,000	126,000	—	—	—	—	1,000	10	
" 5	11.00 A. M.	1.2	0.00	300,000	21,000	17,000	500	17,000	0	—	—	24.0	1.4	0.00	210,000	20,000	9,000	800	5,000	100	—	—	23.0
" 6	11.00 A. M.	1.2	0.00	350,000	325,000	21,000	15,000	14,000	8,000	—	—	23.5	1.6	0.15	920,000	101,000	17,000	6,000	5,000	600	—	—	23.5
" 6	3.15 P. M.	1.1	0.00	110,000	31,000	28,000	2,000	18,000	1,500	1,000	1,000		1.4	0.10	210,000	17,000	10,000	800	4,000	100	1,000	1,000	
" 7	11.00 A. M.	1.0	0.00	670,000	109,000	25,000	800	15,000	0	—	—	22.0	1.1	0.40	400,000	30,000	6,000	1,000	1,000	0	—	—	22.0
" 7	3.15 P. M.	1.0	0.00	1,040,000	37,000	16,000	700	8,000	500	1,000	100		1.5	0.00	630,000	52,000	5,000	2,100	1,000	600	1,000	100	
" 8	11.00 A. M.	1.5	0.05	290,000	16,000	26,000	22,000	35,000	200	10,000	100	22.0	1.0	0.00	180,000	15,000	19,000	1,000	3,000	300	100	10	21.5
September 8	11.00 A. M.	1.0	0.00	170,000	40,000	110,000	7,000	62,000	3,000	—	—	21.5	1.1	0.00	200,000	41,000	76,000	20,000	23,000	6,000	—	—	20.0
" 8	3.15 P. M.	1.6	0.00	—	31,000	120,000	17,000	21,000	6,000	10,000	10		1.9	0.00	290,000	39,000	90,000	8,000	88,000	1,000	10,000	10,000	
" 9	11.00 A. M.	2.6	0.35	320,000	74,000	45,000	2,000	36,000	0	1,000	1,000	20.0	1.4	0.00	270,000	20,000	35,000	1,000	97,000	300	1,000	100	19.5
" 9	3.15 P. M.	2.7	0.50	170,000	29,000	14,000	800	5,000	0	—	—		1.3	0.00	190,000	27,000	15,000	500	9,000	0	—	—	
" 10	11.00 A. M.	2.4	0.15	840,000	42,000	87,000	7,000	16,000	400	—	—	20.0	1.0	0.00	170,000	44,000	25,000	1,400	10,000	800	—	—	19.5
" 10	3.15 P. M.	2.0	0.15	240,000	31,000	70,000	900	42,000	200	—	—		1.0	0.00	160,000	8,000	36,000	1,400	22,000	500	—	—	
" 11	11.00 A. M.	2.6	0.30	640,000	55,000	50,000	100	11,000	0	—	—	20.0	1.6	0.00	520,000	26,000	27,000	100	14,000	200	—	—	20.0
" 11	3.15 P. M.	2.5	0.35	410,000	39,000	29,000	1,200	12,000	0	10,000	100		1.6	0.00	420,000	29,000	10,000	500	5,000	200	10,000	100	
" 14	3.15 P. M.	2.2	0.07	—	—	53,000	—	10,000	200	—	—	21.0	1.1	0.50	—	—	—	3,100	3,000	100	—	—	20.5
" 15	11.00 A. M.	2.7	0.15	—	—	130,000	1,000	100,000	0	100,000	10		1.1	0.40	—	—	67,000	500	10,000	400	10,000	100	
" 15	3.15 P. M.	2.7	0.05	—	—	110,000	3,200	24,000	2,000	10,000	1,000	19.0	1.5	0.00	—	—	60,000	1,200	25,000	400	1,000	1,000	19.0
" 16	11.00 A. M.	2.5	0.35	600,000	38,000	128,000	2,000	60,000	0	—	—		1.5	0.00	540,000	57,000	67,000	2,000	22,000	600	—	—	
" 16	3.15 P. M.	2.7	0.00	390,000	220,000	84,000	18,000	39,000	37,000	10,000	10,000	17.5	1.5	0.00	170,000	25,000	89,000	3,600	30,000	500	1,000	100	17.5
" 18	11.00 A. M.	2.8	0.60	250,000	56,000	85,000	500	33,000	800	—	—	18.5	1.8	0.65	190,000	19,000	25,000	600	18,000	300	—	—	18.5
" 19	11.00 A. M.	2.3	0.65	800,000	102,000	80,000	24,000	60,000	14,000	100	10		1.4	0.60	220,000	25,000	30,000	1,000	19,000	400	100	10	
" 22	11.00 A. M.	1.2	1.25	2,000,000	9,000	—	1,300	37,000	0	—	—		2.2	0.25	870,000	9,000	—	2,000	28,000	900	—	—	
" 22	3.15 P. M.	1.1	1.60	290,000	21,000	20,000	800	17,000	100	10,000	100		2.2	0.00	690,000	22,000	20,000	900	17,000	100	10,000	10	
" 23	11.00 A. M.	3.8	1.25	970,000	18,000	64,000	400	34,000	0	10,000	10		2.4	0.75	910,000	42,000	20,000	200	12,000	400	1,000	1,000	
" 23	3.15 P. M.	3.4	1.25	360,000	16,000	80,000	300	16,000	0	—	—	20.0	2.1	0.30	180,000	11,000	3,000	2,400	5,000	700	—	—	20.0
" 24	3.15 P. M.	3.0	1.25	910,000	2,000	62,000	600	16,000	200	—	—	20.0	2.0	0.10	310,000	31,000	13,000	1,000	6,000	400	—	—	20.0
" 25	11.00 A. M.	4.2	2.10	500,000	12,000	55,000	1,700	24,000	0	—	—		2.3	1.10	220,000	20,000	8,000	1,300	4,000	100	—	—	
" 25	3.15 P. M.	4.2	1.50	580,000	15,000	90,000	700	18,000	0	10,000	10	20.0	2.3	0.40	180,000	10,000	—	1,000	3,000	300	10,000	100	20.0
" 26	11.00 A. M.	4.4	1.80	280,000	22,000	27,000	500	14,000	0	1,000	10	20.0	2.4	0.65	270,000	19,000	11,000	1,000	5,000	200	1,000	100	20.5
" 28	11.00 A. M.	4.1	1.50	190,000	24,000	23,000	600	15,000	0	—	—		2.6	0.55	170,000	15,000	29,000	3,600	6,000	200	—	—	
" 28	3.15 P. M.	4.1	1.50	64,000	6,000	41,000	700	10,000	0	—	—	19.0	2.5	0.25	270,000	28,000	16,000	1,000	5,000	0	—	—	21.0
" 29	11.00 A. M.	2.6	1.05	400,000	22,000	100,000	500	7,000	100	1,000	100		4.5	0.50	190,000	14,000	43,000	—	12,000	200	1,000	100	
" 29	3.15 P. M.	2.9	1.35	410,000	22,000	62,000	—	17,000	200	—	—	17.0	2.6	0.60	240,000	18,000	16,000	1,700	5,000	0	—	—	17.0
" 30	11.00 A. M.	2.7	1.30	180,000	25,000	62,000	15,000	37,000	200	—	—		2.9	0.50	240,000	14,000	78,000	20,000	30,000	1,200	—	—	
" 30	3.15 P. M.	2.7	1.20	300,000	2,000	—	1,400	22,000	200	100,000	10	16.5	1.8	0.50	150,000	17,000	90,000	—	22,000	700	1,000	100	16.5
October 1	11.00 A. M.	2.6	0.65	530,000	67,000	94,000	2,700	40,000	400	—	—		1.8	0.50	220,000	65,000	76,000	2,600	20,000	400	—	—	
" 1	3.15 P. M.	2.5	0.65	200,000	20,000	51,000	19,000	17,000	100	—	—	18.0	1.7	0.20	100,000	10,000	60,000	1,400	10,000	100	—	—	17.5
" 2	11.00 A. M.	2.5	0.75	340,000	45,000	85,000	2,000	65,000	800	—	—		1.7	0.20	610,000	10,000	72,000	2,200	13,000	300	—	—	
" 2	2.15 P. M.	2.4	0.60	150,000	21,000	64,000	2,000	27,000	200	10,000	10	18.0	1.3	0.50	110,000	56,000	42,000	2,800	8,000	700	1,000	100	17.0
" 2	11.00 A. M.	2.5	0.60	1,070,000	70,000	52,000	2,800	23,000	200	100	100	18.0	1.7	0.40	340,000	87,000	87,000	2,400	30,000	500	100,000	1,000	17.5

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*Contaminated.

TABLE No. 3.

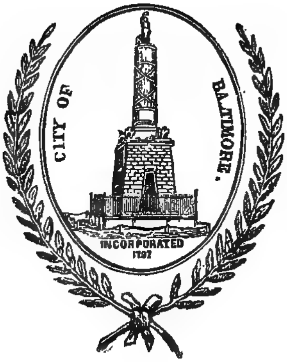
Results of Disinfection of Sprinkling Filter Effluents

1908		6′ BED. 1″ TO 3″ STONE											9′ BED 1″ TO 3″ STONE										
		PARTS PER MILLION		BACTERIA PER C. C.						B. COLI PER C. C.		Temp. of Effluent C°.	PARTS PER MILLION		BACTERIA PER C. C.						B. COLI PER C. C.		Temp. of Effluent C°.
				GELATINE		AGAR TOTAL		ACID FORMERS		LACTOSE BILE					GELATINE		AGAR TOTAL		ACID FORMERS		LACTOSE BILE		
DATE	HOUR	Available Chlorine	Residual Chlorine	Initial	Final	Initial	Final	Initial	Final	Initial	Final		Available Chlorine	Residual Chlorine	Initial	Final	Initial	Final	Initial	Final	Initial	Final	
July 13	3.15 P. M.	0.8	0.00	300,000	120,000	120,000	30,000	30,000	10,000	------	------	23.0	0.9	0.00	260,000	60,000	120,000	70,000	60,000	50,000	------	------	22.5
“ 14	11.00 A. M.	0.8	0.00	120,000	*	120,000	1,000	80,000	0	------	------	22.0	1.1	0.00	400,000	170,000	110,000	5,000	10,000	3,000	------	------	22.0
“ 14	3.15 P. M.	0.8	0.00	250,000	160,000	70,000	8,000	40,000	4,000	10,000	1,000	------	1.1	0.00	260,000	150,000	50,000	2,000	10,000	0	10,000	100	------
“ 15	11.00 A. M.	0.7	0.00	210,000	160,000	360,000	7,000	240,000	0	10,000	100	22.0	1.0	0.00	130,000	120,000	50,000	1,000	20,000	0	1,000	100	21.5
“ 15	3.15 P. M.	1.0	0.00	190,000	160,000	420,000	25,000	280,000	13,000	------	------	------	1.2	0.00	140,000	80,000	60,000	2,000	60,000	2,000	------	------	------
“ 16	11.00 A. M.	1.1	0.00	210,000	40,000	70,000	7,000	30,000	1,000	------	------	20.0	1.3	0.20	180,000	50,000	20,000	6,000	10,000	1,000	------	------	20.0
“ 16	3.15 P. M.	1.0	0.00	850,000	140,000	50,000	3,000	20,000	1,000	1,000	100	------	1.3	0.20	170,000	21,000	80,000	5,000	10,000	0	1,000	100	------
“ 17	11.00 A. M.	1.3	0.05	*	*	30,000	300	10,000	100	1,000	10	21.0	1.6	0.15	190,000	*	70,000	500	10,000	0	10,000	10	20.5
“ 17	3.15 P. M.	1.4	0.05	240,000	29,000	60,000	300	20,000	100	------	------	------	1.5	0.15	100,000	*	2,000	400	1,000	0	------	------	------
“ 18	11.00 A. M.	1.1	0.00	*	16,000	------	------	------	------	------	------	21.0	1.3	0.00	270,000	21,000	------	------	------	------	------	------	21.0
“ 20	11.00 A. M.	1.5	0.00	440,000	240,000	50,000	2,100	40,000	400	------	------	21.0	1.8	0.00	620,000	30,000	32,000	500	21,000	0	------	------	21.5
“ 20	3.15 P. M.	1.6	0.00	1,500,000	78,000	40,000	1,000	40,000	100	------	------	------	1.9	0.00	1,130,000	38,000	45,000	500	31,000	0	------	------	------
“ 21	11.00 A. M.	1.5	0.00	740,000	142,000	70,000	2,400	30,000	1,200	1,000	100	22.0	1.7	0.00	1,750,000	13,000	16,000	400	12,000	0	1,000	10	22.0
“ 21	3.15 P. M.	1.4	0.00	750,000	34,000	21,000	200	15,000	0	------	------	------	1.5	0.00	740,000	21,000	6,000	800	4,000	0	------	------	------
“ 22	11.00 A. M.	1.4	0.00	420,000	48,000	47,000	2,000	39,000	300	------	------	23.0	1.5	0.00	390,000	28,000	25,000	800	19,000	0	------	------	23.0
“ 22	3.15 P. M.	1.4	0.00	570,000	73,000	56,000	900	45,000	400	10,000	100	------	1.6	0.00	670,000	31,000	26,000	1,400	9,000	0	1,000	10	------
“ 23	11.00 A. M.	1.4	0.00	410,000	61,000	35,000	2,000	34,000	1,600	------	------	22.5	1.6	0.00	350,000	30,000	10,000	600	4,000	0	------	------	22.5
“ 23	3.15 P. M.	1.5	0.00	410,000	50,000	100,000	700	60,000	300	------	------	------	1.5	0.00	1,490,000	9,000	30,000	1,000	10,000	0	------	------	------
“ 24	11.00 A. M.	1.5	0.00	380,000	20,000	32,000	2,500	12,000	0	------	------	22.5	1.9	0.10	160,000	9,000	13,000	500	6,000	0	------	------	22.5
“ 24	3.15 P. M.	1.5	0.00	540,000	19,000	------	------	------	------	1,000	100	------	1.8	0.10	310,000	17,000	------	------	------	------	1,000	1,000	------
“ 25	11.00 A. M.	1.1	0.00	310,000	56,000	18,000	3,200	9,000	1,600	1,000	1,000	23.5	1.4	0.00	400,000	13,000	6,000	1,300	4,000	200	10,000	100	23.5
“ 27	11.00 A. M.	0.9	0.00	------	------	10,000	25,000	1,000	10,000	------	------	22.0	1.5	0.20	------	------	3,000	1,000	2,000	0	------	------	22.0
“ 27	3.15 P. M.	1.1	0.00	------	------	------	------	------	------	1,000	100	------	1.5	0.20	------	------	------	------	------	------	1,000	10	------
“ 28	11.00 A. M.	1.1	0.00	270,000	35,000	11,000	5,000	700	300	------	------	22.0	1.2	0.00	450,000	25,000	19,000	300	5,000	100	------	------	22.0
28	3.15 P. M.	1.3	0.00	280,000	33,000	11,000	1,300	6,000	600	1,000	1,000	------	1.4	0.00	620,000	50,000	3,000	300	1,000	100	1,000	10	------
“ 29	11.00 A. M.	1.2	0.00	640,000	64,000	60,000	30,000	8,000	100	------	------	22.0	1.4	0.00	330,000	170,000	70,000	25,000	3,000	0	------	------	22.0
“ 29	3.15 P. M.	1.3	0.00	950,000	73,000	16,000	15,000	7,000	1,600	------	------	------	1.4	0.00	710,000	24,000	50,000	5,000	2,000	0	------	------	------
“ 30	11.00 A. M.	Settling basins cleaned. Septic action apparent.																					
“ 30	3.15 P. M.	1.0	0.00	220,000	25,000	130,000	11,000	21,000	900	10,000	1,000	22.0	1.2	0.00	120,000	22,000	120,000	400	7,000	200	1,000	100	22.5
“ 31	11.00 A. M.	1.0	0.00	260,000	58,000	300,000	700	3,000	200	------	------	22.5	1.2	0.00	610,000	74,000	150,000	20,000	2,000	0	------	------	22.0
“ 31	3.15 P. M.	1.0	0.00	370,000	59,000	70,000	7,000	2,000	0	1,000	1,000	------	1.2	0.00	340,000	1,700	30,000	2,600	3,000	0	100	100	------
August 1	11.00 A. M.	1.5	0.50	600,000	28,000	116,000	8,400	41,000	500	1,000	100	23.0	1.8	0.90	190,000	22,000	------	------	------	------	100	100	23.0
“ 3	11.00 A. M.	2.1	0.25	------	------	8,000	1,100	8,000	0	10,000	10	23.5	2.3	0.75	------	------	30,000	2,000	4,000	0	100	100	23.0
“ 3	3.15 P. M.	2.0	0.15	210,000	13,000	------	500	------	0	------	------	------	2.4	0.75	110,000	16,000	16,000	1,000	0	0	------	------	------
“ 4	11.00 A. M.	0.9	0.00	580,000	133,000	15,000	10,000	11,000	0	------	------	23.5	1.1	0.00	450,000	39,000	50,000	3,400	1,000	100	------	------	23.0
“ 4	3.15 P. M.	0.9	0.00	500,000	46,000	------	------	------	------	1,000	10	------	1.0	0.00	280,000	125,000	------	------	------	------	1,000	10	------
“ 5	11.00 A. M.	1.2	0.00	350,000	34,000	17,000	900	12,000	0	------	------	24.0	1.4	0.05	210,000	20,000	9,000	800	5,000	100	------	------	23.0
“ 6	11.00 A. M.	1.2	0.00	350,000	325,000	21,000	15,000	14,000	3,000	------	------	22.5	1.5	0.15	220,000	101,000	17,000	2,000	3,000	600	------	------	22.5
“ 6	3.15 P. M.	1.1	0.00	310,000	31,000	38,000	3,000	18,000	1,500	1,000	1,000	------	1.4	0.15	310,000	17,000	10,000	900	4,000	100	1,000	1,000	------
“ 7	11.00 A. M.	1.3	0.00	570,000	108,000	25,000	800	15,000	0	------	------	23.0	1.7	0.65	460,000	83,000	6,000	1,000	1,000	0	------	------	23.0
“ 7	3.15 P. M.	1.0	0.00	1,040,000	37,000	16,000	700	4,000	600	1,000	100	------	1.6	0.00	620,000	52,000	3,000	2,100	1,000	600	1,000	100	------
“ 8	11.00 A. M.	1.5	0.05	290,000	18,000	26,000	22,000	20,000	300	10,000	100	22.0	1.9	0.65	180,000	15,000	19,000	1,000	5,000	300	100	10	21.5
September 8	11.00 A. M.	1.6	0.00	170,000	40,000	110,000	7,000	62,000	3,000	------	------	20.5	1.1	0.00	700,000	47,000	76,000	20,000	23,000	6,000	------	------	20.0
“ 8	3.15 P. M.	1.8	0.00	------	31,000	120,000	17,000	31,000	6,000	10,000	10	------	1.0	0.00	230,000	33,000	96,000	5,000	55,000	1,000	10,000	10,000	------
“ 9	11.00 A. M.	2.6	0.35	320,000	74,000	45,000	2,000	26,000	0	1,000	1,000	20.0	1.4	0.00	270,000	26,000	55,000	1,200	27,000	300	1,000	100	19.5
“ 9	3.15 P. M.	2.7	0.50	170,000	20,000	14,000	800	5,000	0	------	------	------	1.3	0.00	190,000	23,000	15,000	900	3,000	0	------	------	------
“ 10	11.00 A. M.	2.4	0.15	840,000	42,000	87,000	2,500	68,000	800	------	------	20.0	1.5	0.00	170,000	44,000	25,000	1,400	16,000	800	------	------	19.5
“ 10	3.15 P. M.	2.6	0.15	240,000	31,000	70,000	900	42,000	200	------	------	------	1.6	0.00	160,000	8,000	36,000	1,400	22,000	300	------	------	------
“ 11	11.00 A. M.	2.6	0.30	640,000	55,000	56,000	600	41,000	0	------	------	20.0	1.6	0.00	520,000	36,000	27,000	600	14,000	200	------	------	20.0
“ 11	3.15 P. M.	2.5	0.35	410,000	22,000	29,000	1,200	12,000	0	10,000	100	------	1.6	0.00	430,000	29,000	10,000	300	5,000	200	10,000	100	------
“ 14	3.15 P. M.	2.2	0.00	------	------	53,000	------	10,000	200	------	------	21.0	1.1	0.00	------	------	------	3,100	3,000	100	------	------	20.5
“ 15	11.00 A. M.	2.7	0.15	------	------	135,000	1,600	100,000	0	100,000	10	------	1.7	0.00	------	------	67,000	900	45,000	400	10,000	100	------
“ 15	3.15 P. M.	2.7	0.05	------	------	115,000	5,200	24,000	2,000	10,000	1,000	19.0	1.5	0.00	------	------	60,000	1,200	25,000	400	1,000	1,000	19.0
“ 16	11.00 A. M.	2.5	0.35	600,000	26,000	128,000	2,000	60,000	0	------	------	------	1.3	0.00	340,000	72,000	57,000	2,900	35,000	600	------	------	------
“ 16	3.15 P. M.	2.7	0.00	380,000	220,000	84,000	78,000	22,000	37,000	10,000	10,000	17.5	1.5	0.00	170,000	25,000	89,000	2,600	30,000	900	1,000	100	17.5
“ 18	11.00 A. M.	2.8	0.60	270,000	36,000	85,000	500	52,000	200	------	------	18.5	1.8	0.03	190,000	19,000	25,000	600	18,000	300	------	------	18.5
“ 19	11.00 A. M.	2.3	0.03	600,000	103,000	83,000	24,000	60,000	14,000	100	10	------	1.4	0.00	220,000	35,000	30,000	1,000	19,000	400	100	10	------
“ 22	11.00 A. M.	4.2	1.25	2,080,000	8,000	------	1,300	37,000	0	------	------	------	2.2	0.25	870,000	9,000	------	2,000	28,000	200	------	------	------
“ 22	3.15 P. M.	4.1	1.65	250,000	21,000	20,000	300	17,000	100	10,000	100	------	2.3	0.00	280,000	22,000	30,000	900	12,000	100	10,000	10	------
“ 23	11.00 A. M.	3.8	1.25	970,000	18,000	64,000	600	34,000	0	10,000	10	------	2.4	0.15	210,000	42,000	20,000	800	12,000	400	1,000	1,000	------
“ 23	3.15 P. M.	3.4	1.25	360,000	15,000	26,000	500	18,000	0	------	------	20.0	2.1	0.25	180,000	11,000	9,000	7,400	5,000	100	------	------	20.0
“ 24	3.15 P. M.	3.6	1.25	600,000	2,000	62,000	600	46,000	200	------	------	20.0	2.0	0.15	310,000	31,000	13,000	1,000	6,000	600	------	------	20.0
“ 25	11.00 A. M.	4.2	2.10	500,000	13,000	55,000	1,700	34,000	0	------	------	------	2.3	1.15	320,000	32,000	8,000	1,100	4,000	100	------	------	------
“ 25	3.15 P. M.	4.2	1.50	880,000	15,000	90,000	700	18,000	0	10,000	10	20.0	2.5	0.40	180,000	10,000	------	1,600	3,000	300	10,000	100	20.0
“ 26	11.00 A. M.	4.4	1.85	360,000	22,000	27,000	500	14,000	0	1,000	10	20.0	2.8	0.65	220,000	19,000	11,000	1,000	5,000	200	1,000	100	20.5
“ 28	11.00 A. M.	4.1	1.50	190,000	24,000	29,000	600	15,000	0	------	------	------	2.6	0.35	170,000	18,000	29,000	3,500	6,000	200	------	------	------
“ 28	3.15 P. M.	4.1	1.50	64,000	6,000	44,000	700	16,000	0	------	------	21.0	2.5	0.28	290,000	28,000	16,000	1,000	5,000	0	------	------	21.0
“ 29	11.00 A. M.	2.8	1.05	400,000	23,000	100,000	500	7,000	100	1,000	100	------	1.9	0.50	190,000	14,000	43,000	------	12,000	200	1,000	100	------
“ 29	3.15 P. M.	3.0	1.35	410,000	22,000	63,000	------	17,000	200	------	------	17.0	2.0	0.55	240,000	18,000	16,000	1,700	5,000	0	------	------	17.0
“ 30	11.00 A. M.	2.7	1.30	180,000	25,000	68,000	18,000	37,000	200	------	------	------	1.9	0.50	240,000	14,000	78,000	20,000	26,000	1,200	------	------	------
“ 30	3.15 P. M.	2.7	1.30	260,000	9,000	------	1,400	22,000	200	100,000	10	16.5	1.9	0.50	150,000	17,000	99,000	------	22,000	700	1,000	100	16.5
October 1	11.00 A. M.	2.6	0.60	530,000	87,000	94,000	2,700	40,000	900	------	------	------	1.9	0.25	220,000	65,000	76,000	2,500	29,000	400	------	------	------
“ 1	3.15 P. M.	2.5	0.60	200,000	20,000	51,000	19,000	17,000	100	------	------	18.0	1.7	0.25	100,000	16,000	60,000	1,400	16,000	100	------	------	17.5
“ 2	11.00 A. M.	2.5	0.75	340,000	45,000	85,000	2,900	35,000	800	------	------	------	1.7	0.25	610,000	10,000	72,000	2,200	13,000	300	------	------	------
“ 2	3.15 P. M.	2.4	0.60	150,000	23,000	64,000	2,900	27,000	200	10,000	10	18.0	1.5	0.00	110,000	55,000	42,000	2,800	4,000	700	1,000	100	17.5
“ 3	11.00 A. M.	2.5	0.60	1,070,000	70,000	52,000	2,800	33,000	300	100	100	18.0	1.7	0.05	340,000	87,000	87,000	2,400	20,000	500	100,000	1,000	17.5

*Contaminated.

Annual Report
of the
Sewerage Commission
of the
City of Baltimore

1910



BALTIMORE
MEYER & THALHEIMER
PUBLIC PRINTER

1911

SEWERAGE COMMISSION

OF THE

CITY OF BALTIMORE

AMERICAN BUILDING

BALTIMORE, December 31, 1910.

HON. J. BARRY MAHOOL,
Mayor of Baltimore.

SIR:

In obedience to the requirements of Section 1, Chapter 349, of the Acts of the General Assembly of Maryland for 1904, this Commission has the honor to make the following report of its transactions during the year:

FINANCIAL REPORT.

Pursuant to and under the contract entered into by the Mayor and City Council of Baltimore with the Baltimore Audit Company, for an audit of all the City Departments' accounts, the said Audit Company made an audit of the Commission's accounts from the date of the last audit to the close of business December 31, 1910, and duly reported to the Commission as follows:

"We have completed an audit and examination of your books and accounts for the year 1910, together with the verification of original vouchers in the Comptroller's office in the City Hall.

"We have, during the course of our examination, made the usual complete audit of the details of your books of original entry. As usual, we found everything in good order, and it is evident that the same conscientious attention has been bestowed on your records by your office force."

It is proper to add here, that the Commission, before the City entered into the contract with said Audit Company for a general audit of all the City s accounts, established the custom of having its books examined every year by the Baltimore Audit Company since the beginning of the Commission.

The disbursements for the year 1910 are further contained in the annual detailed statement of expenditures, made in the form of a report to the City Comptroller, and summarized as follows:

Expended for Construction	$1,355,980	43
Expended for Construction Force Salaries	128,444	25
Expended for Administrative Salaries	26,887	50
Expended for Special Expenses	23,771	94
Total	$1,535,084	12
Credit:		
By amount derived from sale of old material, plans, specifications, etc	4,102	77
Net total expenditures, 1910	$1,530,981	35

CONSTRUCTION.

Realizing that the completion of the sewerage system at an early date means so much to the people, from the standpoint of general health and convenience; also that such early completion will mean a great saving in the final cost of the system to the tax payers, it has been the policy of the Commission to have the work planned well in advance and to encourage in every way rapidity of construction.

Our Chief Engineer, Mr. Hendrick, and his splendid corps of assistants have entered so heartily in the spirit of this policy that they are well in advance of our expectations and we now fear that the original $10,000,000 loan will be exhausted before the next loan can be passed upon by the people and made available.

The Commission heartily commends the Chief Engineer and his assistants for their excellent work and their devotion to it. For the details of their progress during this year, your Honor is referred to the report of the Chief Engineer, dated December 31, 1910, appended hereto, marked "A."

STORM WATER.

The construction of the Storm-Water System, which when completed will be entirely separate from and independent of the Sanitary System, has been pushed forward as rapidly as our present funds would permit. The Commission, believing that the completion of the Sanitary System was most urgent, has confined its work on storm-water largely to such sections as required immediate relief to prevent damage to property, yet about one-tenth of our present available funds have been expended on this system. The work on this system will also be found in detail in the report of the Chief Engineer. In order that we and our fellow citizens may feel assured that we are getting the best system known to science at the present time, we had retained as a Board of Advisory Engineers, Messrs. Rudolph Hering, Frederic P. Stearns and Samuel M. Gray. These gentlemen are recognized the world over as authorities on such work.

They, together with our Chief Engineer, planned our system and have from time to time been called here for consultation and inspection.

Their last report to the Commission, dated April 14, 1910, is hereto appended, marked "B."

PUMPING STATION.

The cornerstone of this fine building was laid in the presence of a large gathering of our prominent officials and citizens, on June 4. Through the kindness of Gen. Thomas J. Shryock, Grand Master of Masons of Maryland, and many of his fellow officers and members of the Grand Lodge of Maryland, the stone was laid under the rites and ceremonies of the Masonic Order.

The construction of the foundation and subsequent erection of the superstructure have progressed as rapidly as could be expected, considering the delays to which the work was subjected.

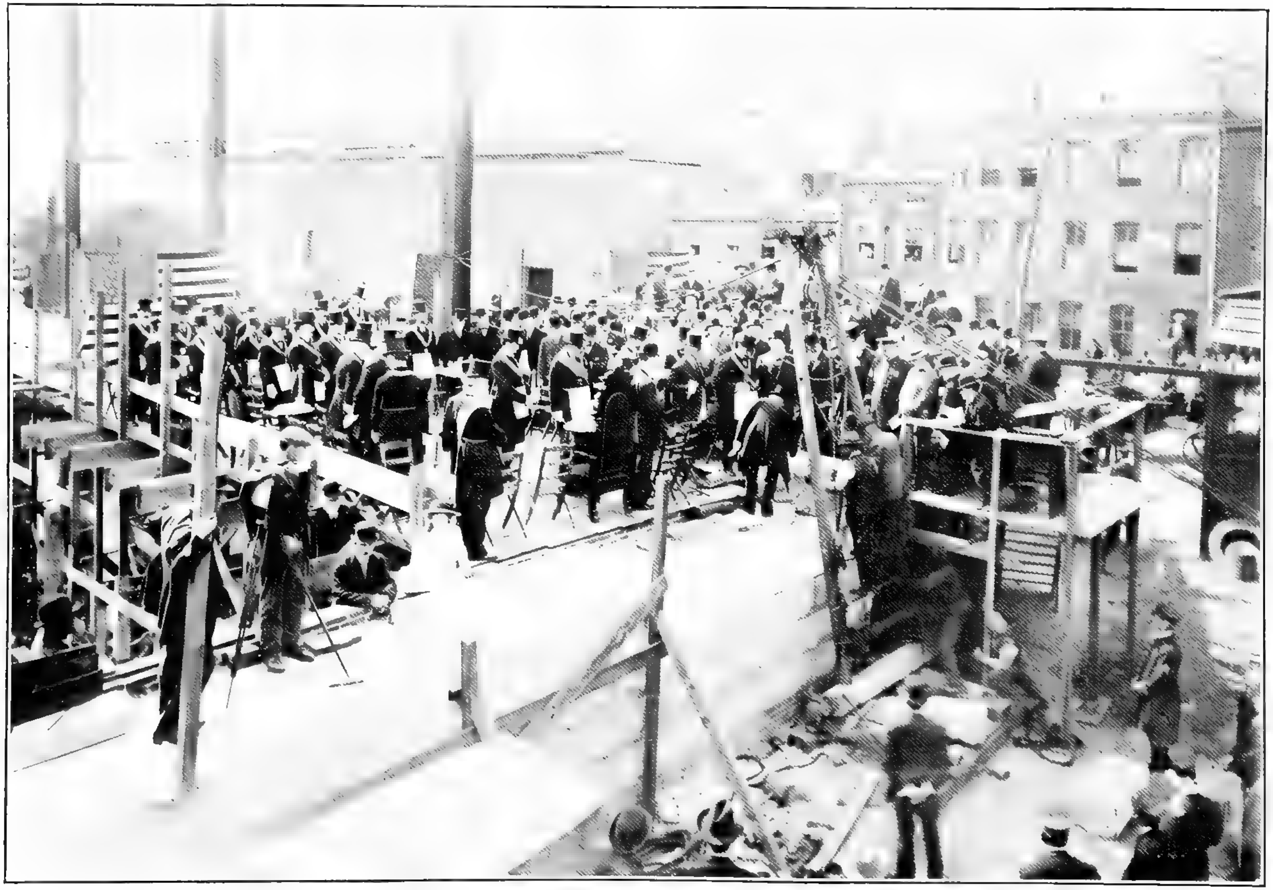
The controversy brought about through the misapprehension of the Building Inspector as to the stability of the foundation, was settled to the satisfaction of the Commission, our Chief Engineer being sustained by every possible test and by expert opinions of Frederic P. Stearns, Consulting Engineer, and Major Wm. E. Craighill and Capt. Chas. C. Ballou, Corps of Engineers, United States Army.

In order to facilitate the construction work, the Chief Engineer divided the City into certain sections convenient for systematic work, but after investigating many complaints from our citizens in different parts of the City we discovered some frightfully unsanitary conditions that required immediate attention, notably Forest Park, where large areas had been developed without any attempt to provide sanitary drainage.

In all such cases the Commission have endeavored to give prompt relief as far as the money available made this feasible.

The Commission has also carefully considered every proposition of development presented to it which promised considerable increase of the taxible basis provided proper drainage was furnished.

We have met this proposition by furnishing plans conforming with our general system, to the property owners at cost,



LAYING THE CORNER STONE AT THE SEWAGE PUMPING STATION.

when the owner may lay the drain at his expense. If the drains are constructed according to our plans, we give the owner a certificate to that effect, which certificate will be redeemed at our basis of cost when we reach that section.

The original Enabling Act provides for the construction of the sewerage system to the building line, and the people passed favorably on the loan with this understanding. An effort was made to so amend this provision in the new Enabling Act as to provide that the Commission should construct only to the curb line.

While this would have resulted in a great saving in the original cost of the system, yet it would add materially to the direct expense to property even to becoming an unnecessary burden upon the owners of small property. The Commission, therefore, recommended to the Legislature that the provision be not so amended, which recommendation was accepted by them.

The improvement of Jones Falls as suggested and planned by the Sewerage Commission in its report for the year 1906, contemplating the construction of our storm-water sewer in the bed of Jones Falls in such a manner as to admit of the placing on its surface of a wide, useful artery of traffic, reaching from the heart of the City as far north and west as Union Station, has developed during the past year into a concrete proposition.

The Legislature passed an Enabling Act permitting the City to create a loan of $1,000,000 for the purpose, and empowering the Mayor to appoint a commission to carry these plans into effect.

The enormity of this work is such as to necessitate the division of the Commission into many standing and special committees, so that each proposition may receive the personal investigation and consideration necessary by one or more of the members before being finally acted upon by the Commission. This means that in addition to the occasional official tours of inspection by the entire Commission, there are very frequent investigations by one or more committees.

Most of our construction being either underground or beyond the City limits, prevents the general public from obtaining a comprehensive idea of what has been accomplished. We occasionally have the pleasure, however, of escorting citizens over the works and are always glad to do so.

During the session of the Legislature, the Baltimore City Delegation honored us with such a visit and were apparently very favorably impressed.

It was also our pleasure to welcome the members of the Grand Jury of the September term of this year. Their appreciation of our work is expressed in their final report which is appended hereto marked "C."

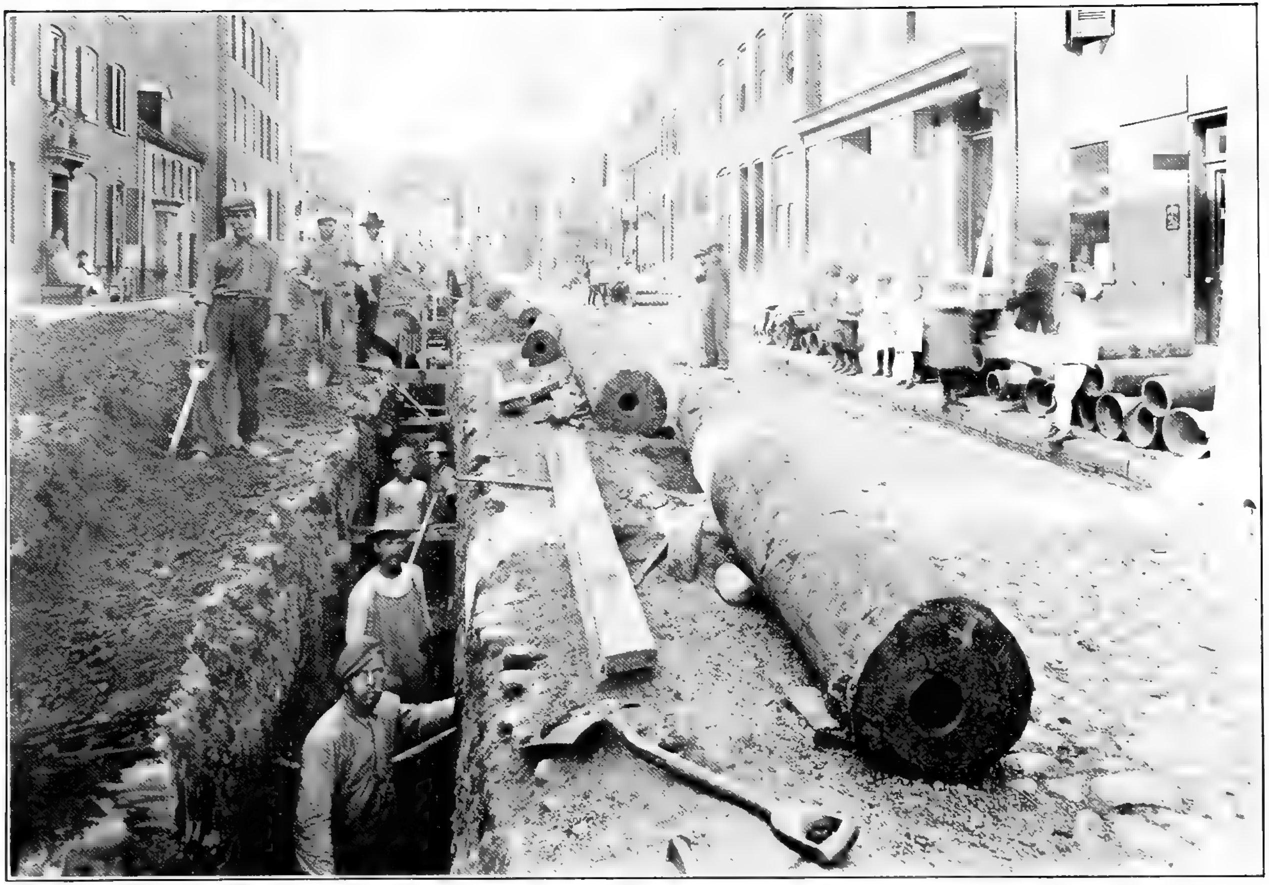
The members of this Commission deeply regret the serious illness of our Chairman, General Peter Leary, Jr., and are hoping for his speedy recovery.

Because of his illness, we are obliged to present this report without his signature.

Respectfully submitted,

WILLIAM D. PLATT, *Chairman Pro tem.,*
J. BARRY MAHOOL, *Mayor,*
MORRIS WHITRIDGE,
IRA REMSEN,
CHARLES ENGLAND,
J. EDWARD MOHLER,

HARRY W. RODGERS, *Secretary.*



WOODEN WATER PIPES, ABOUT 100 YEARS OLD.

Found in Sewer Trench in Exeter Street, Between Lexington Street and Necessity Alley.

APPENDIX "A"

ANNUAL REPORT

OF THE

CHIEF ENGINEER

FOR THE YEAR 1910

BALTIMORE, December 31, 1910.

BRIG. GEN'L. PETER LEARY, JR., *Chairman, and*
GENTLEMEN OF THE SEWERAGE COMMISSION.

DEAR SIRS:

I have the honor to present to you a report upon the work done by the Engineering Department of the Commission, from January 1, 1910, to December 31, 1910.

During the year the work has progressed in the same rapid manner as in the previous years.

I am pleased to announce that the sewerage system is about half completed, and that we are within our estimated cost and time.

We will begin the actual use of the system the coming Fall, by beginning to connect up houses in Northeast Baltimore.

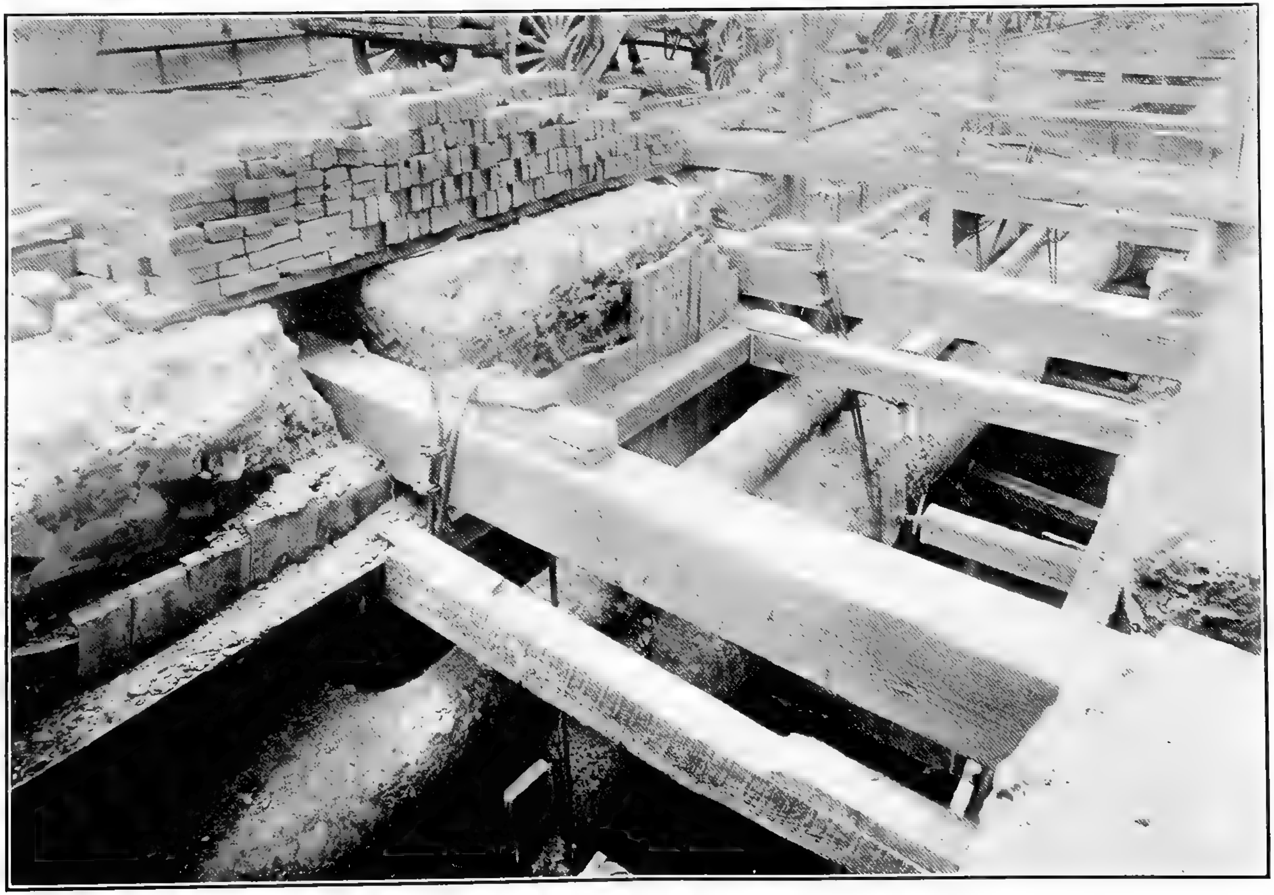
There is one fact I would like to impress on the citizens of Baltimore, viz: that the present $10,000,000 Sewerage Loan was voted on and passed before the present Sewerage Commission came into existence. The present Commission, therefore, is not responsible for having to ask for an additional loan. We have never made but one estimate or one statement as to cost and time of completion, as outlined in our 1907 Report, as follows:

"With the aid of the information now at hand, I feel safe in saying that the cost of the sanitary sewers as outlined in the Commission's Report for 1906 will be about $14,000,000 based upon present prices and the assumption that it will be possible to push the work vigorously. If for any reason the work should be delayed, an increased allowance will have to be made for salaries, office rent and other expenses. If the work is vigorously prosecuted, it is believed that the sanitary sewers as laid out in the Commission's Report for 1906 can be fully completed by the year 1914. The entire storm-water system, as outlined in the Commission's Report for 1906, can probably be constructed for about $4,500,000."

On account of the low rate of interest paid on the bonds, the City was obliged to sell the first loan at $516,529.83 less than its face value, leaving only $9,483,470.17 available for the work.

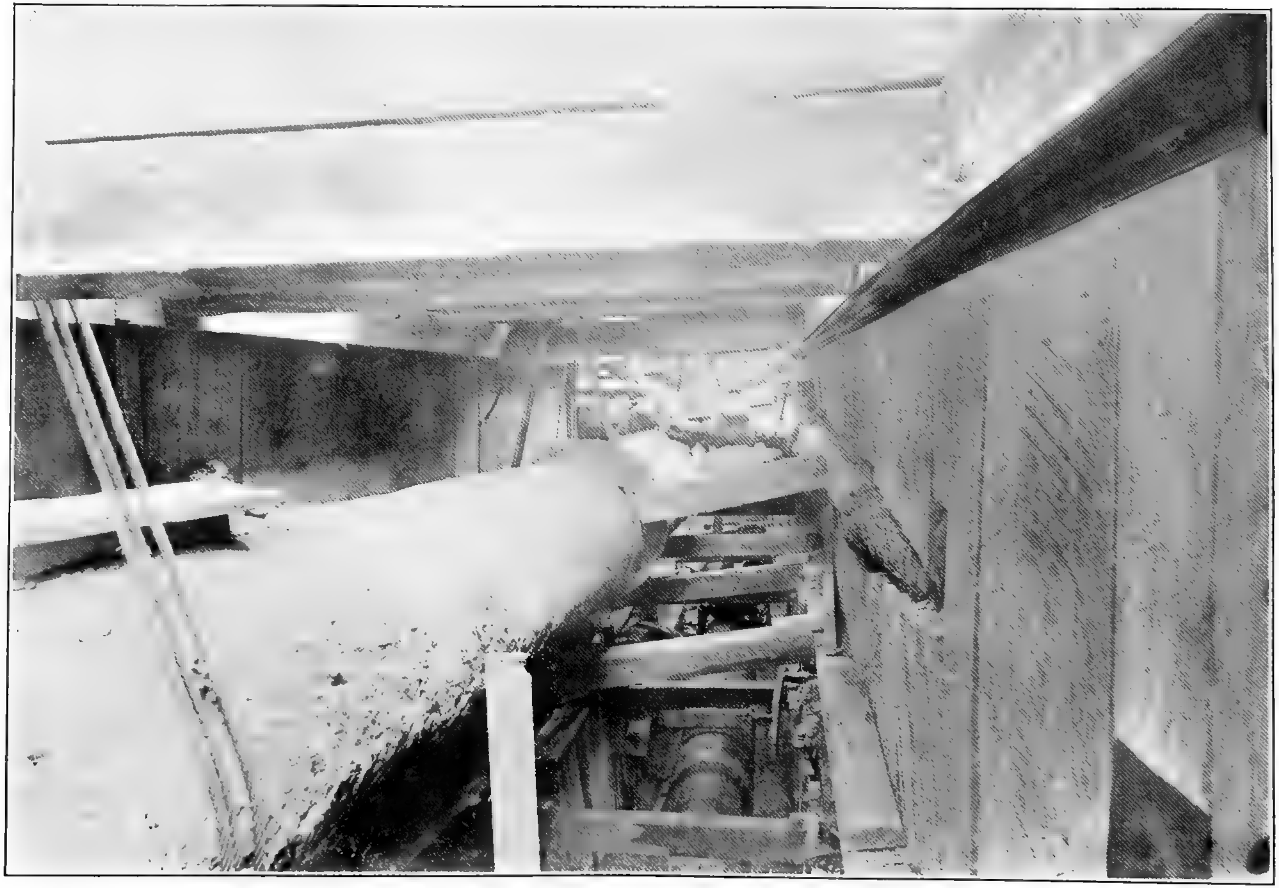
Unless one takes the time to visit in person some of the construction work being carried on in various parts of the City by the Sewerage Commission, neither the magnitude of the work nor the diversified engineering problems that are being solved every day can be realized. The people outside of Baltimore seem to appreciate this more than do the citizens of Baltimore, from the fact that we have visitors from all parts of the world. These foreign visitors are not the merely idle or curious, but are citizens of consequence and engineers who are doing things throughout the world.

Our work is most interesting on account of its complications. I will endeavor to convey a slight idea of its magnitude and difficulties. We will start on the supposition that water must flow down hill. This means that an eight-inch

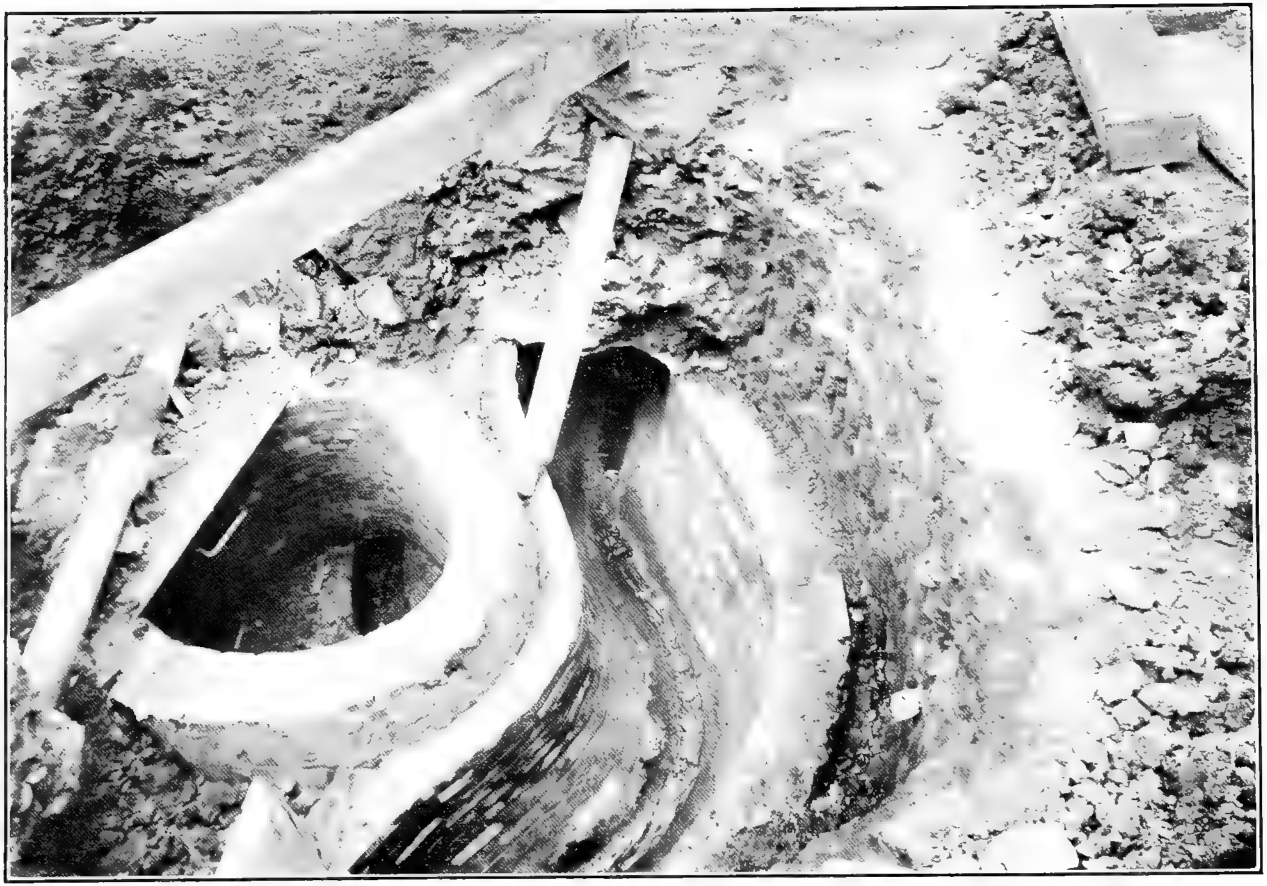


SEWER TRENCH IN GRANBY STREET.

Showing 24-Inch Gas Main and 12-Inch Water Main, and Methods of Supporting Same.



SEWER TRENCH IN GRANBY STREET.
Another View Showing 24-Inch Gas and 12-Inch Water Mains.



OLD STORM-WATER INLET CONNECTION, RECONSTRUCTED TO PASS AROUND SANITARY SEWER MANHOLE.

sewer beginning at Forest Park, thirteen miles distant from the Disposal Plant, must continue on a constantly falling grade, which cannot be flattened beyond certain rates, ever increasing in size as sewers lead into it from valleys and hills covering an area of thirty-two square miles; in its path crossing Peck's Branch, the Baltimore and Ohio Railroad tunnel, over and under Jones Falls, the Pennsylvania Railroad tunnels, crossing over ravines, swinging around hills, tunneling through ridges, passing through narrow alleys, by the side of tall buildings, ever continuing on the constant falling grade; ever increasing in size until, on reaching the Disposal Plant, it is large enough to contain two automobiles, one on top of the other.

Two-thirds of the sewage of the City is intercepted and carried to the Disposal Plant by gravity; the other third is lifted by enormous pumps, each with a capacity of 27,500,000 gallons a day, from a point thirteen feet below tide to the Outfall Sewer, a height of seventy-two feet (including friction); an unusually heavy lift, especially as sewage is much more difficult to pump than water. Three of these enormous pumps are constructed and are now being installed. The Pumping Station is large enough for two more, to be installed later. The foundations for these pumps have been so constructed, independent of the foundations for the building, as to absorb all shocks.

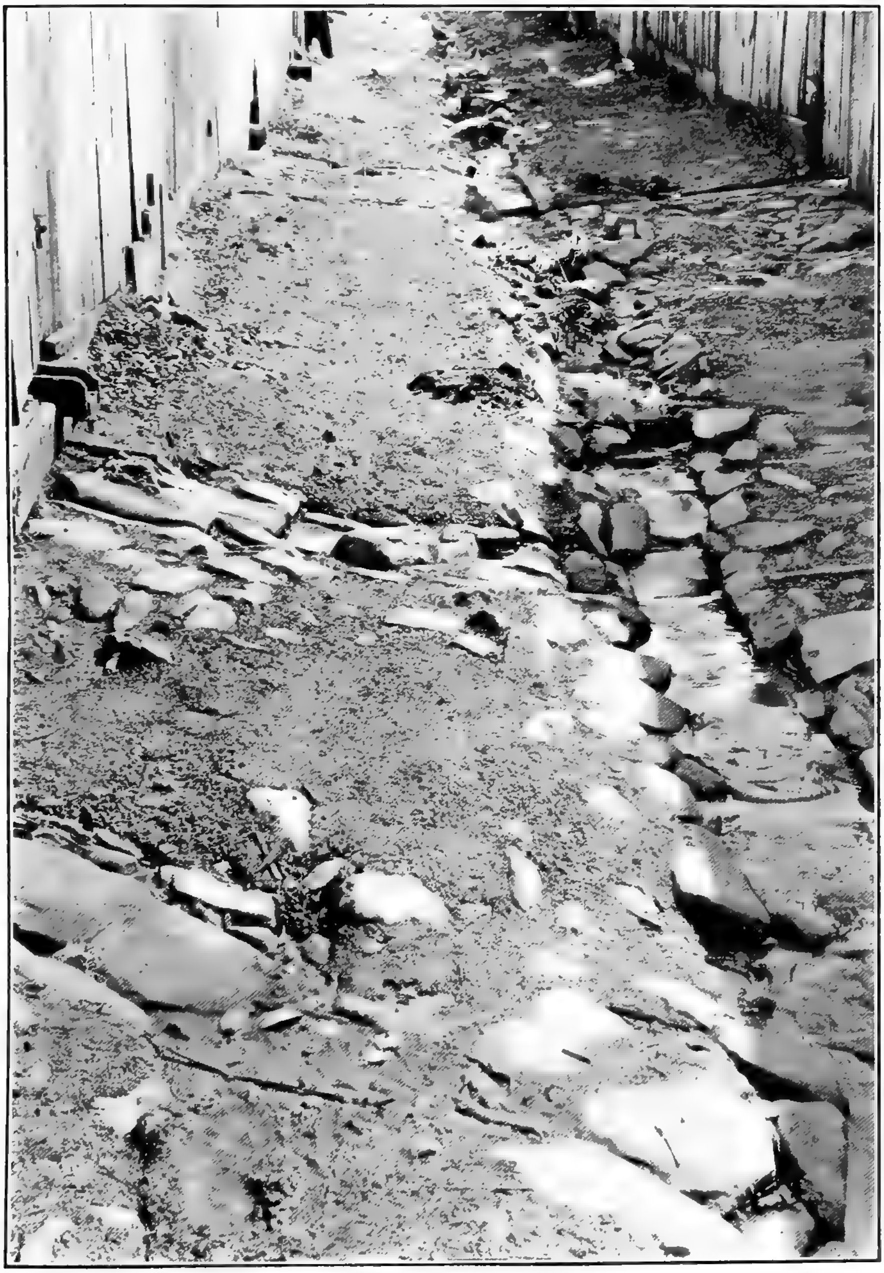
The difficulty of our work is doubled on account of having to construct two systems of sewers and drains, crossing and recrossing each other in a thousand different places. The reason for the necessity of constructing two systems is that the Legislature requires every gallon of sewage taken into the sanitary system to be purified before discharging it into the Chesapeake Bay or its tributaries. It is therefore of the utmost importance that we reduce the amount of sewage to be pumped and treated to a minimum, in order to keep down the size of the sewers, the pumping plant, the disposal plant, and to eliminate the constant pumping and treating of clean rainwater. To attempt to treat all the rain that falls would break a city. Therefore, the sanitary sewers will take care of the drainage from bath tubs, kitchen sinks and toilets, and the rainwater will pass off through storm-water drains, by inlets at the corners, to its natural outlets, such as Jones Falls, Gwynns Falls and the harbor.

To attempt to install two systems of drains and sewers in the beds of streets of a city over a hundred years old, in which a mass of pipes have been laid, but in which practically no space for sewers and drains has been left, brings us face to face with a serious problem; and these sewers and drains must continue on ever descending, regular grades, and cannot twist over and under obstructions like water pipes, gas pipes and other public structures.

If the sewers could be laid in the streets it would simplify matters, but, as far as we can, we are attempting to lay them in the alleys, which are very narrow. Unless you have had experience in building a sewer in a narrow alley with a constant surface flow from kitchen sinks and bath tubs, lined with old brick buildings on shallow foundations and in bad condition, with leaking water pipes and sewers under the surface, you cannot realize the difficulties we have to overcome. This constant trickling flow in the alleys causes a rapid accumulation of ice in cold weather; this will be eliminated when the sanitary sewers are in service. In the low section, around the harbor, construction difficulties are even greater, as the sewers are below tide level.

The City is getting its sewers constructed for almost cost, on account of the wholesale prices secured by extensive advertising. A great part of the work is being done by machinery, which is the proper way to get low prices.

Up to the present time the following work has been completed: The Outfall Sewer, extending from Chase and Durham streets to the Disposal Plant at Back River; the High Level



TYPICAL NARROW ALLEY.
Showing Condition of Paving and Flow of Water.

Interceptor, from Chase and Durham streets to Jones Falls; the Jones Falls Interceptor, paralleling the east side of Jones Falls, and passing through the new Union Station grounds, from Eager street to North avenue; the McMechen Street Interceptor, crossing Jones Falls at North avenue and extending from Falls Road, through McMechen and Laurens streets, to Druid Hill avenue; the Force-mains and the Force-main Sewer, from the Pumping Station at Eastern and East Falls avenues to the Outfall Sewer; the East Low Level Interceptor, from the Pumping Station, through President, Aliceanna and Boston streets, to Hudson street; the West Low Level Interceptor, from the Pumping Station, through President, Pratt, Light, Hill, Sharp, Ostend and Warner streets, to Alluvion street. The Pumping Station is practically completed, with the roof on and the chimney half way up. The Interceptors and Pumping Station have been planned to meet the requirements of a City with a population of a million people.

A considerable part of the lateral sanitary sewers in East Baltimore has been completed, the connections having been carried to the fence lines where the sewers are located in the rear, and to the curb line only, where the sewers are located in front or at the side. The Sewerage Commission will later on extend the sewer connections up to the property or building line where the sewer is located in front, making the expense to the property holder of connecting up with the sewerage system a small one in either case.

In addition to the above, a sanitary sewer system and disposal plant are in operation covering a large part of Walbrook, and another disposal plant, with trunk sewers covering a large section in the northwestern part of the City, is also in operation.

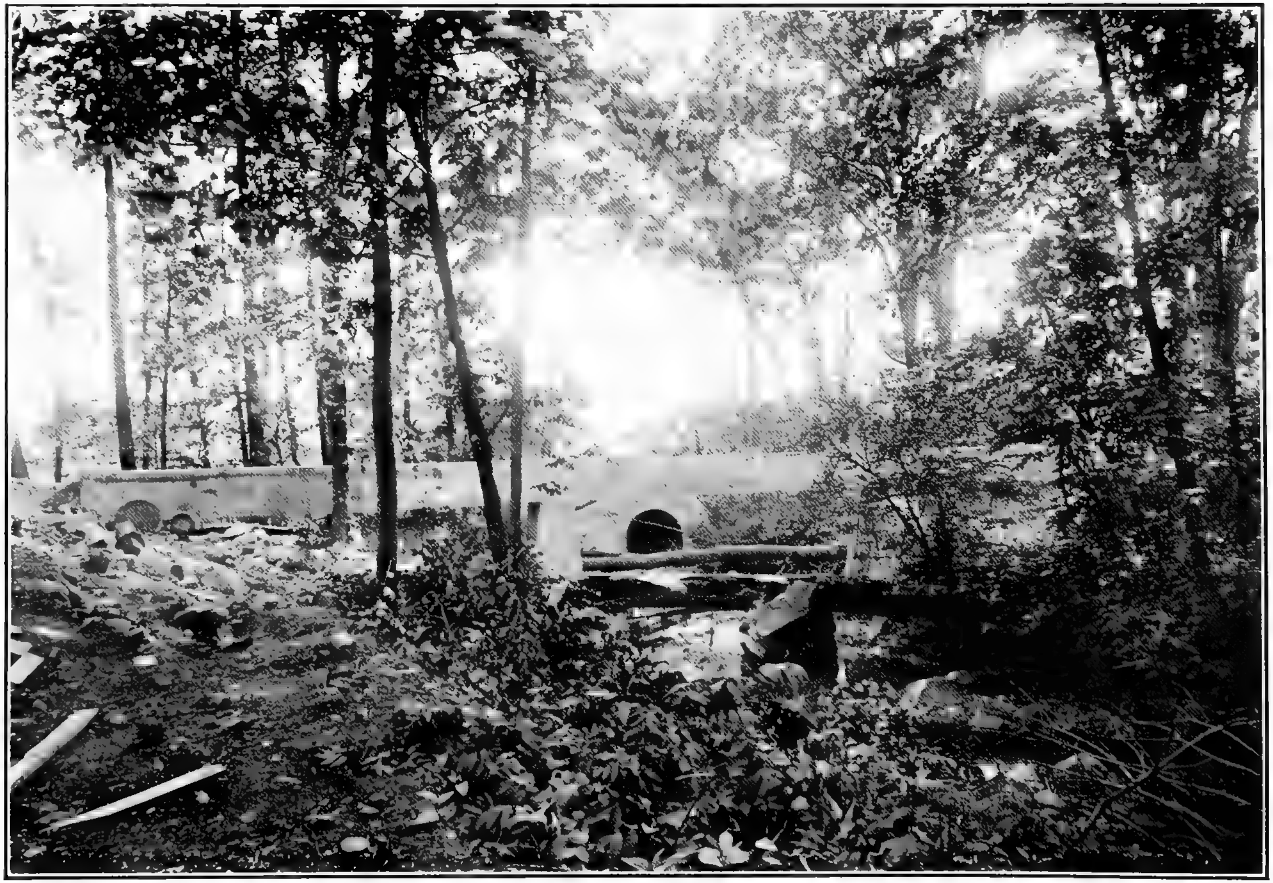
In addition to the regular work of the Commission's Engineering Force in the designing and building of the Pumps, Disposal Works, sanitary sewers and storm-water drains, a great deal of work has been done in preparing plans for, and supervising the construction of, sewers to be constructed by private parties. This work is entirely outside of the regular work of the Commission, but it has been undertaken in order to save the property owners of the City the losses which would result from the construction of private sewers along lines which would not allow them to be incorporated into the General System of Sanitary Sewers. During the year, sixteen such private sewers were constructed by private parties under our supervision, having an aggregate length of 17,920 feet. This work on private sewers in widely scattered parts of the City has required much study and work.

In 1907 the Mayor issued instructions that all applications for permits to build structures under the surface of the public streets, and plans of all structures to be built by other City Departments, should be submitted to the Sewerage Commission for examination as to their probable interference with future sewer work. This work has grown to very large proportions, and has required during the year the entire time of one member of the Engineering Force, and half the time of another. During the year over 2,000 drawings and plans, showing proposed structures in the streets, were received, the relations of the proposed structures to future sewer work were investigated, and reports were made to the proper departments.

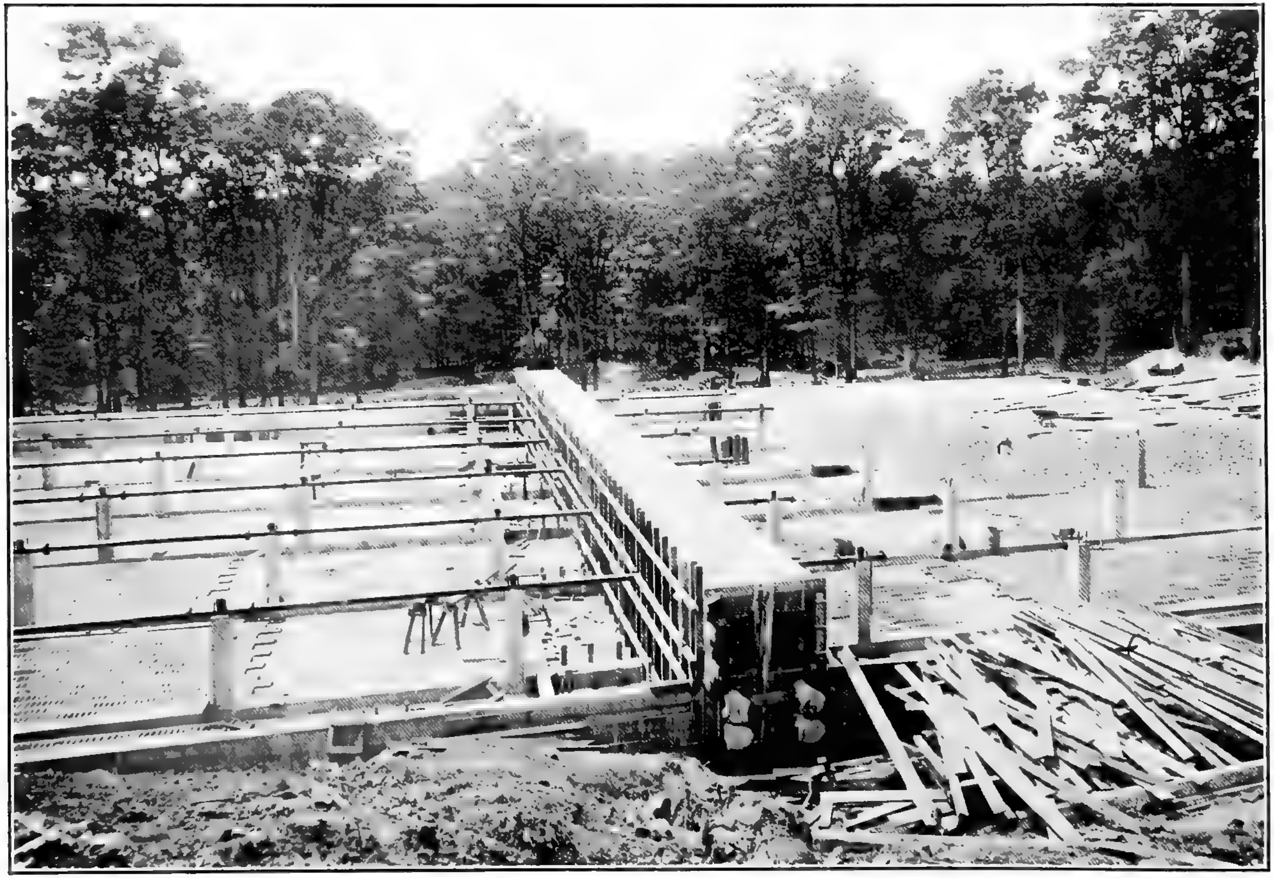
CONSTRUCTION.

Northwestern Section.

Upon the urgent request of the residents of the northwestern section of the City, in order to relieve the bad sanitary conditions which prevented the development of that section, the City Council appropriated $35,000 to be used by the Sewerage Commission for the construction of a temporary Disposal Plant on a part of the City park property, just west of the Western Maryland Railroad and south of Liberty road. This action was taken because the Commission could not use for temporary

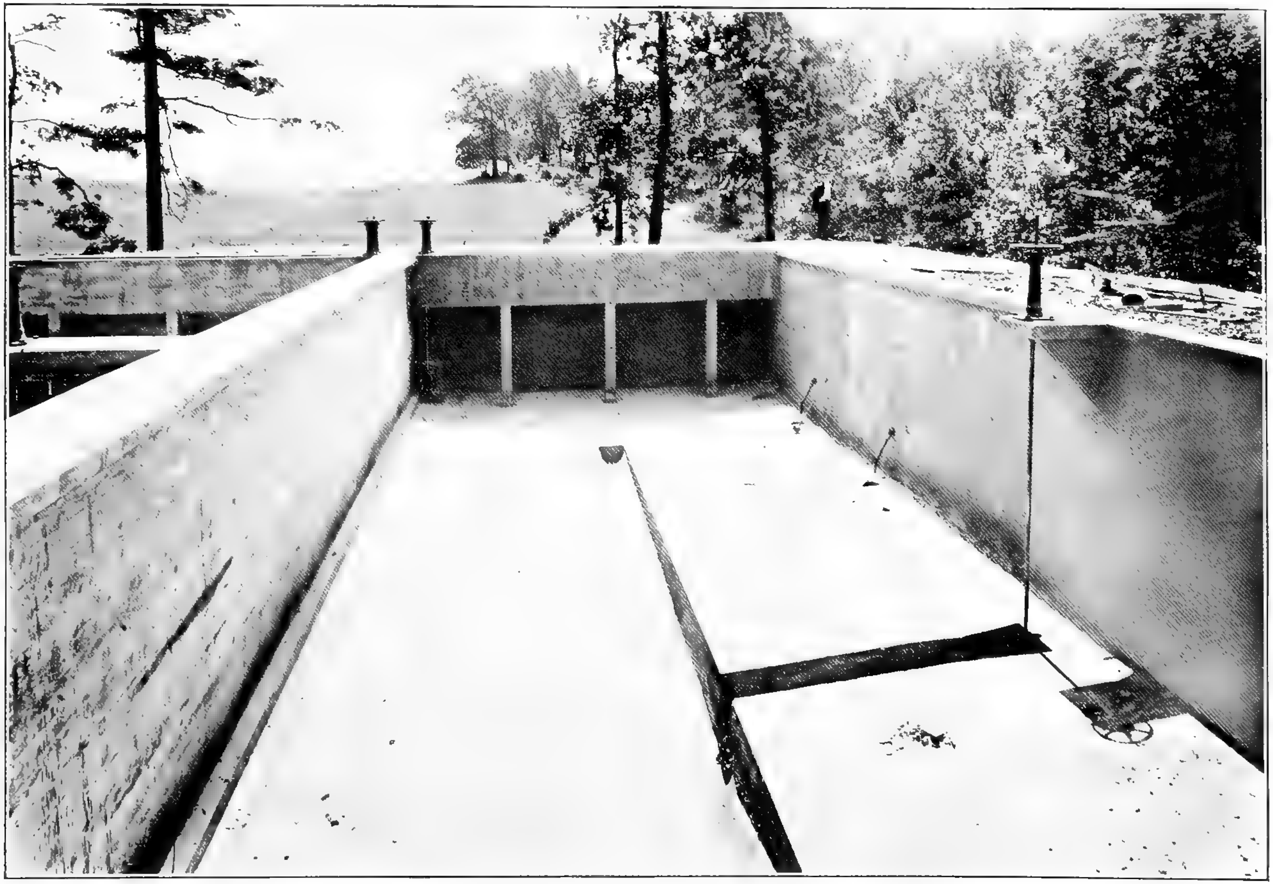


CONCRETE BRIDGE CARRYING SANITARY SEWER OVER PECKS BRANCH.
Mouth of 114-Inch Storm-Water Drain Under Liberty Road in Background.

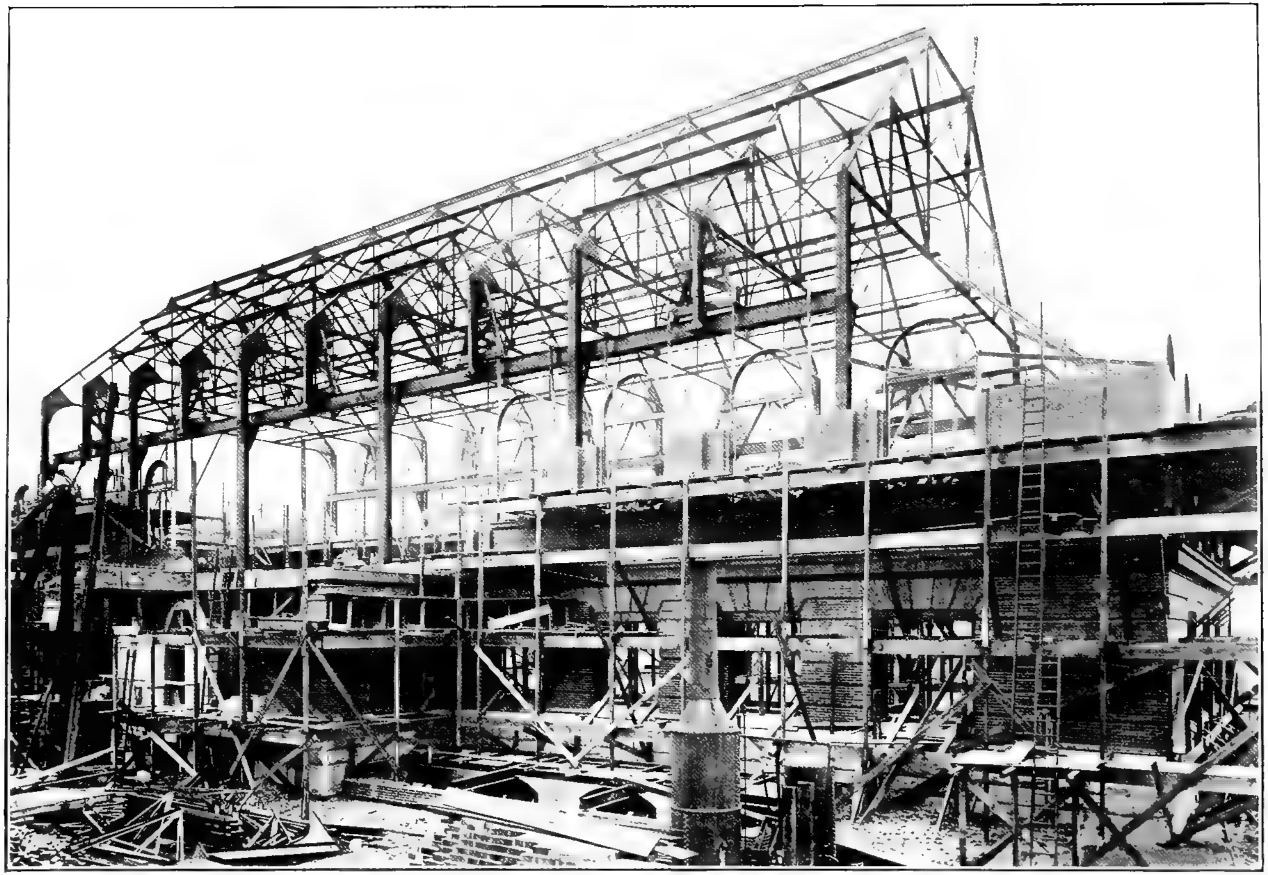


FOREST PARK DISPOSAL PLANT.

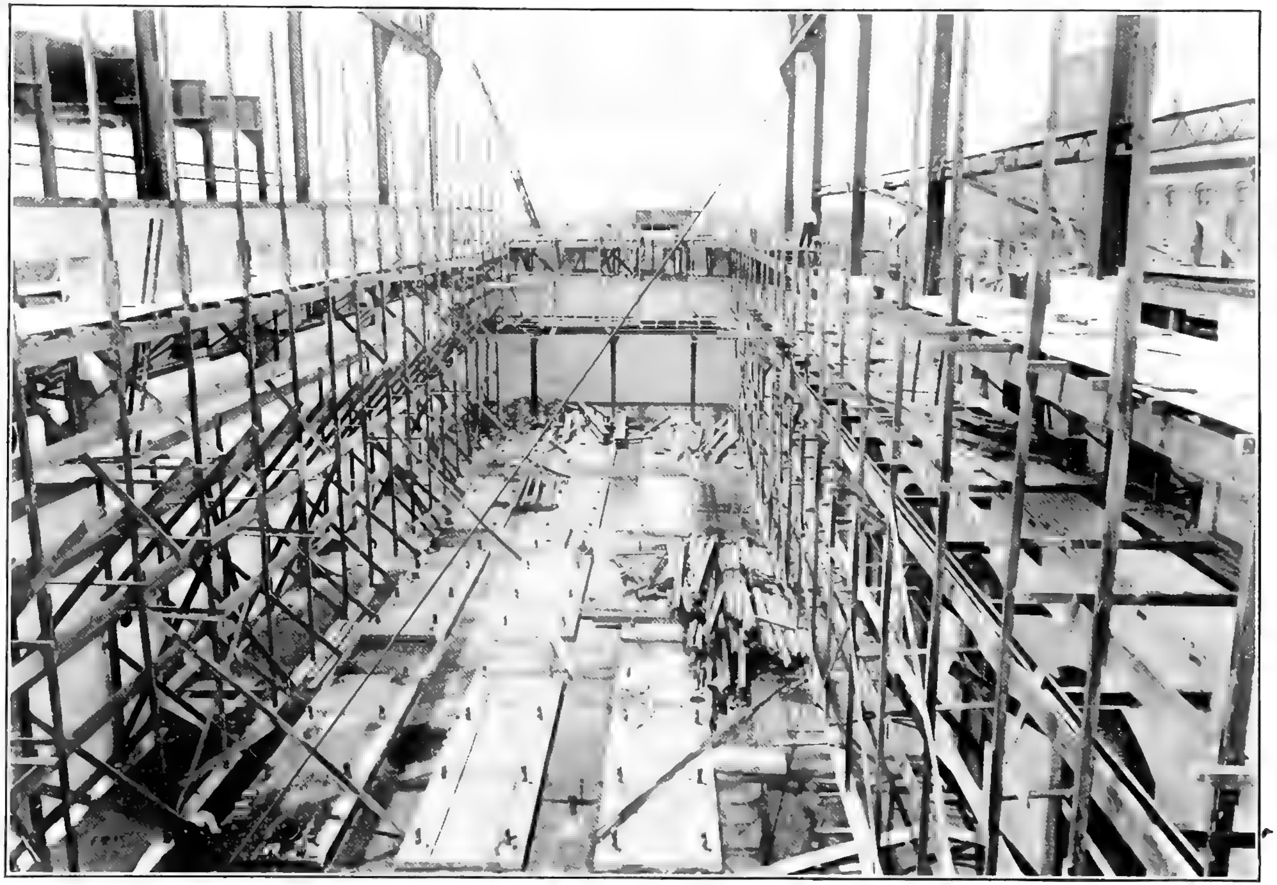
Sprinkling Filters Under Construction and Partly Filled With Broken Stone.



FOREST PARK DISPOSAL PLANT.
Hydrolytic Tank.

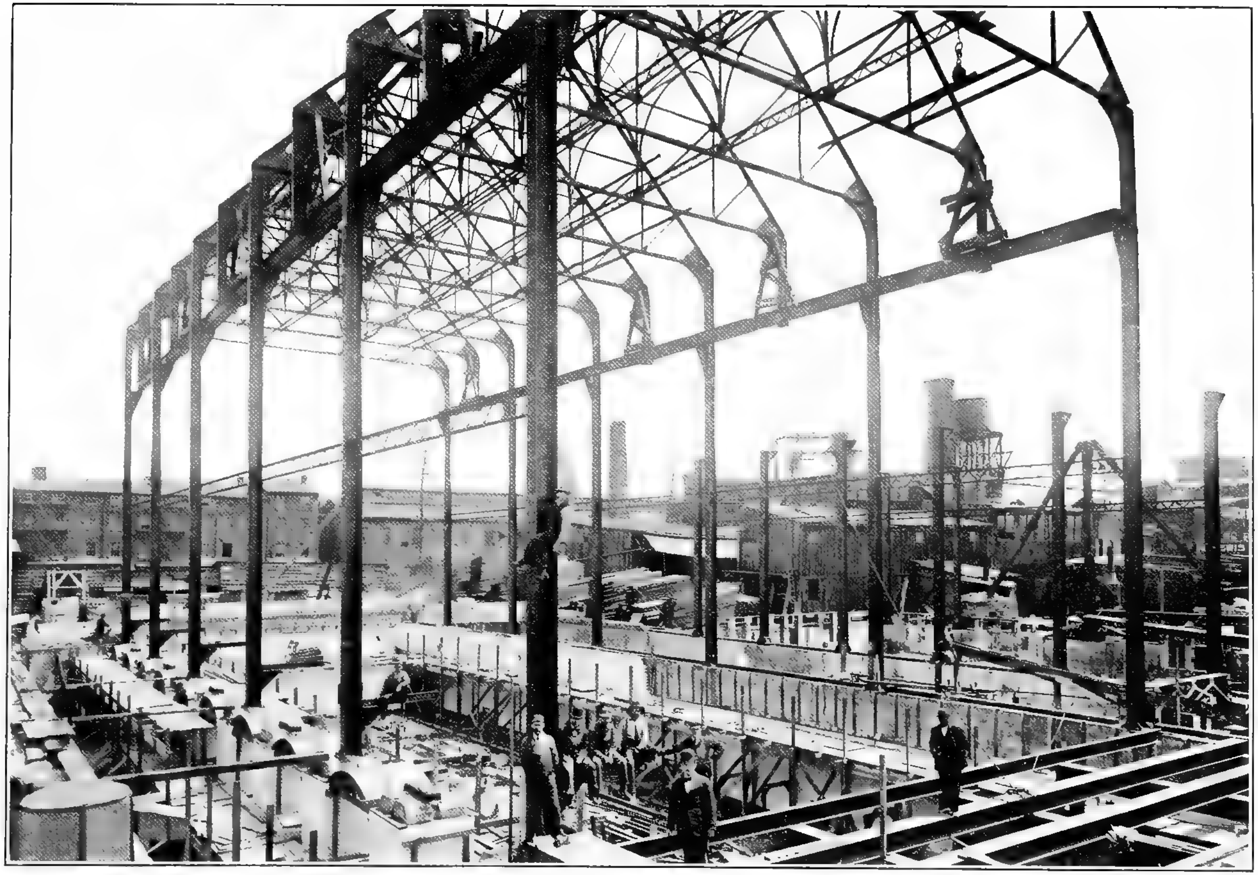


SEWAGE PUMPING STATION.
North Side of Building, August 15, 1910.

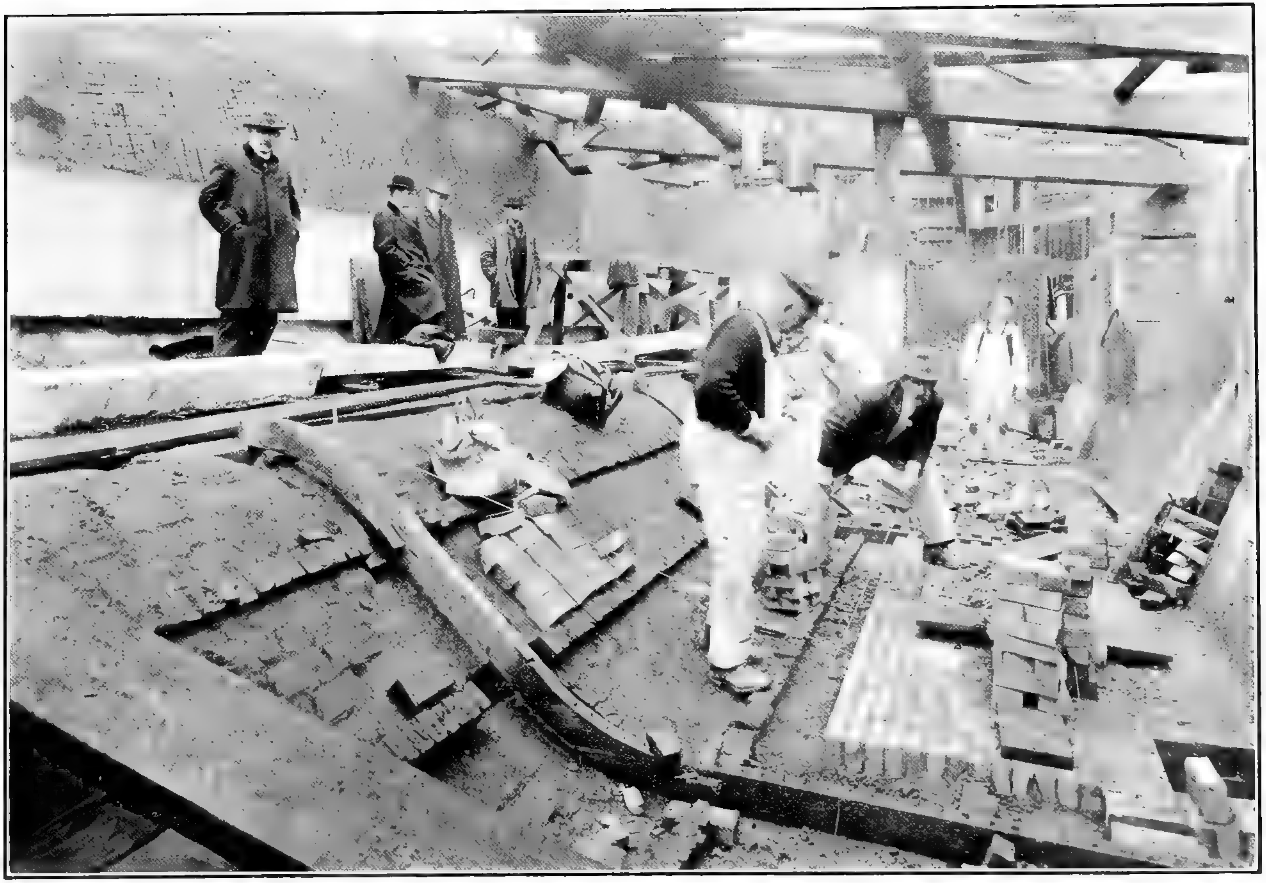


SEWAGE PUMPING STATION.

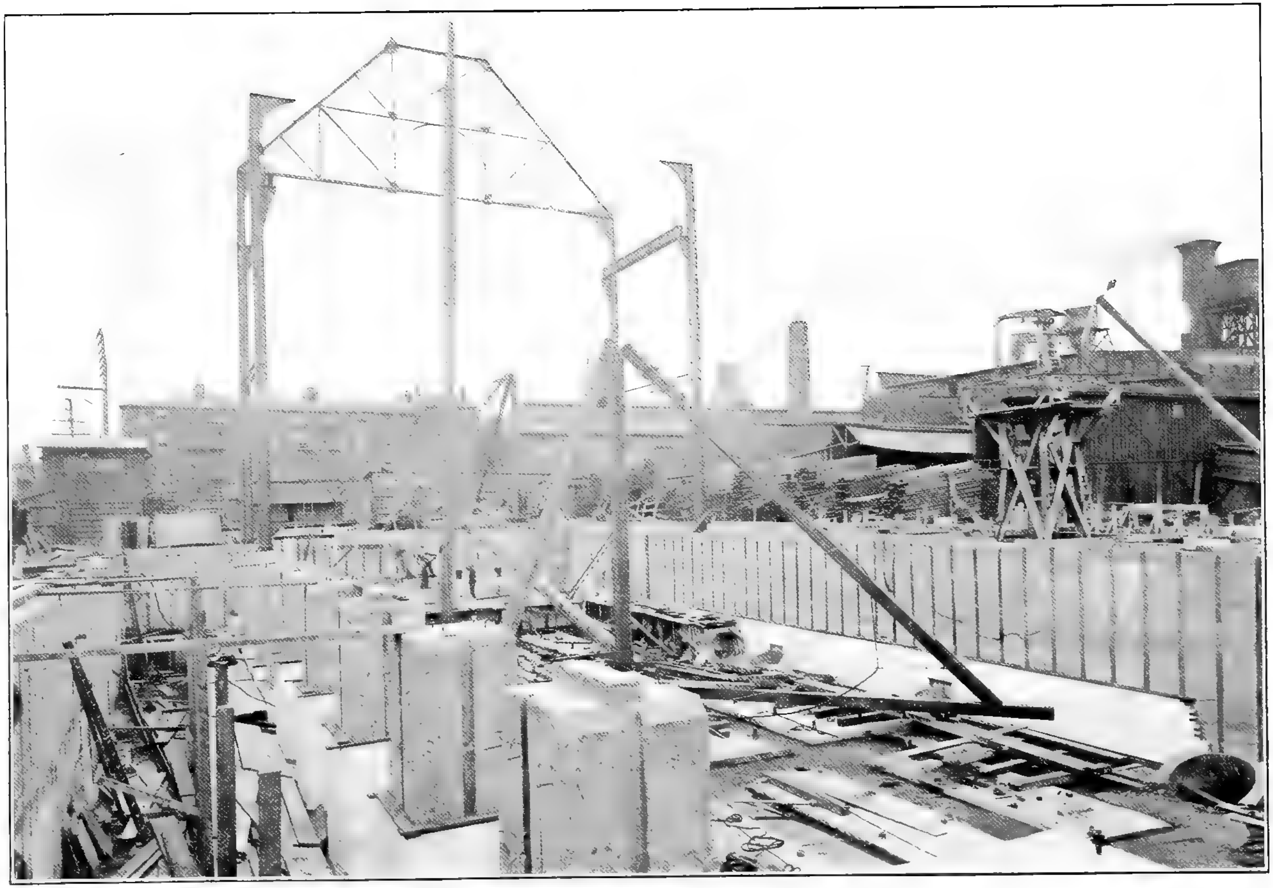
Engine Room, Looking West, Showing Enameled Brick Lining and Completed Steel Work, July 13, 1910.



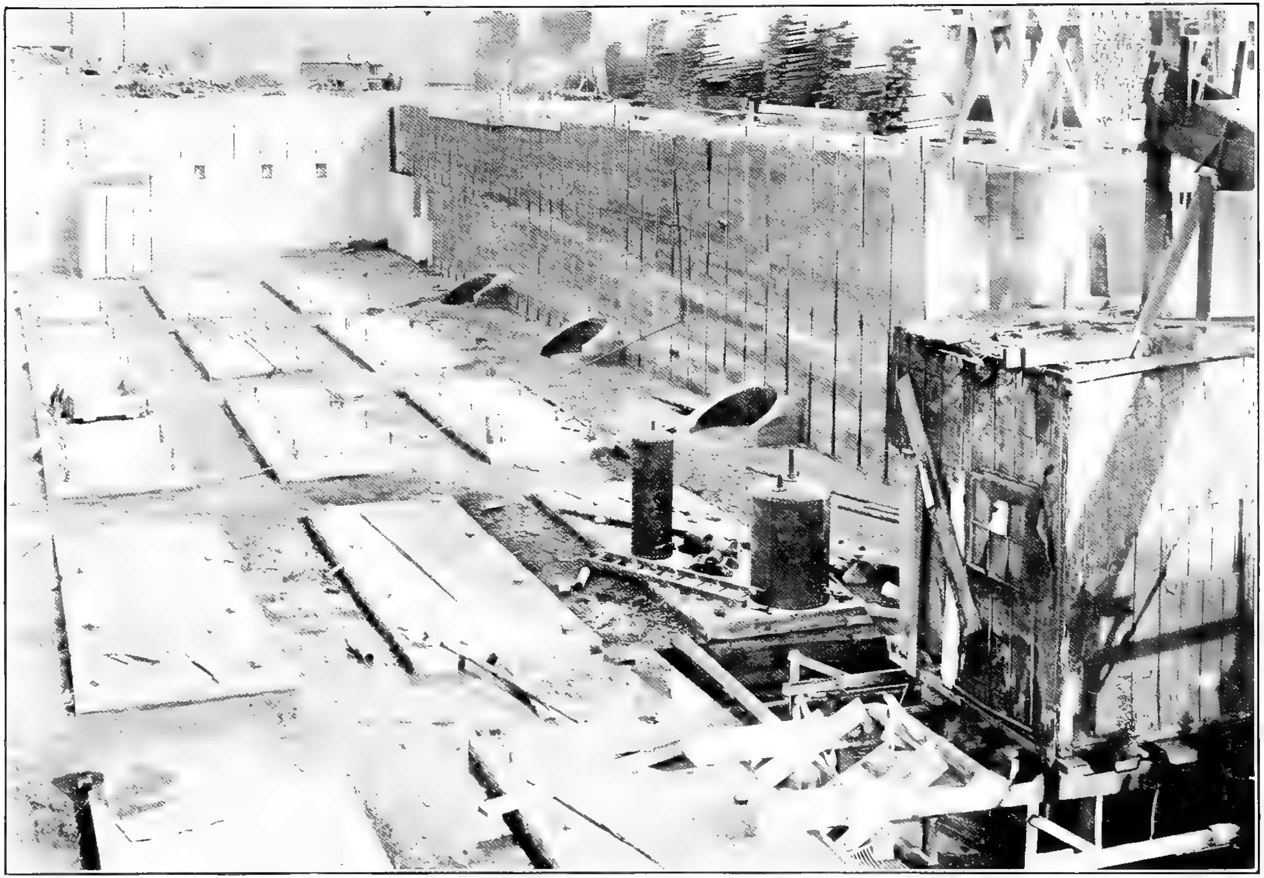
SEWAGE PUMPING STATION.
Completed Frame Work of Engine Room, May 4, 1910.



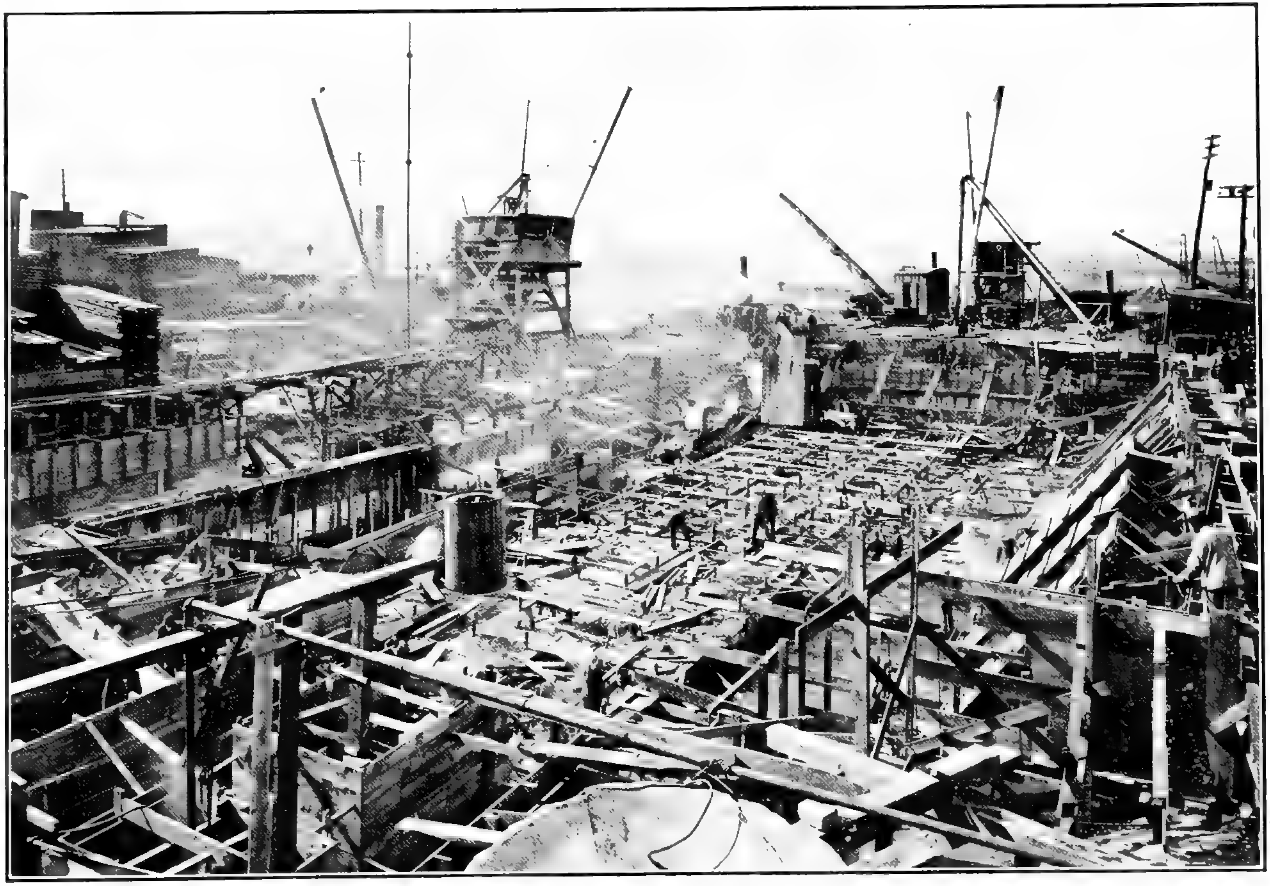
SEWAGE PUMPING STATION.
Laying Brick Lining in Screen Chamber.



SEWAGE PUMPING STATION.
First Roof Truss Over Engine Room, April 7, 1910.



SEWAGE PUMPING STATION.
Completed Foundation of Engine Room, March 18, 1910.



SEWAGE PUMPING STATION.
General View of Site, February 14, 1910.

construction any part of the Sewerage Loan, and the proposed disposal plant will be abandoned when the sanitary sewer system is completed. The Commission, however, undertook to build at its own cost, trunk sewers along their permanent plans covering a considerable part of the northwestern section of the City, in order to give an outlet for the sewage, on the understanding that the eight-inch lateral sewers and the house-connections would be constructed by the property owners. The trunk sewers were nearly completed during the year, and the Disposal Plant was completed and put in operation about October 15. The completion of this system of sewers and the Disposal Plant will permit a rapid development of this large section of the City; in fact, building operations have already increased largely and the taxable value of the territory is rapidly increasing.

Sanitary.

On March 21 the construction of the Substructure of the Sewage Pumping Station had progressed to such a point that we were able to begin the erection of the Superstructure. At the end of the year the Substructure work was practically completed, and about 75 per cent. of the work on the Superstructure was finished, the cornerstone having been laid on June 4, 1910, with appropriate Masonic ceremonies, in the presence of the Mayor, the Sewerage Commission and other City officials.

The sanitary lateral sewers in the following districts were completed during the year:

No. 21—Covering the area between Pratt street on the north, Broadway on the east, the Harbor on the south, and Jones Falls on the west;

No. 25—Covering the territory between Biddle street on the north, Milton avenue on the east, Ashland avenue and Monument street on the south, and Chester and Washington streets on the west;

No. 27—Covering the territory between Fayette street and Orleans street on the north, Chester street and Patterson Park avenue on the east, Pratt street and Baltimore street on the south, and Broadway, Wolfe street and Bond street on the west;

No. 29—Covering the territory between Lanvale street and North avenue on the north, Harford avenue, Broadway, Caroline and Bond streets on the east, Gay street on the southeast, Eager street on the south, and Forrest, Valley and Ensor streets on the west;

No. 35—Covering the territory between Hoffman street on the north, Valley street and Forrest Place on the east, Biddle and Eager streets on the south, and Jones Falls on the west.

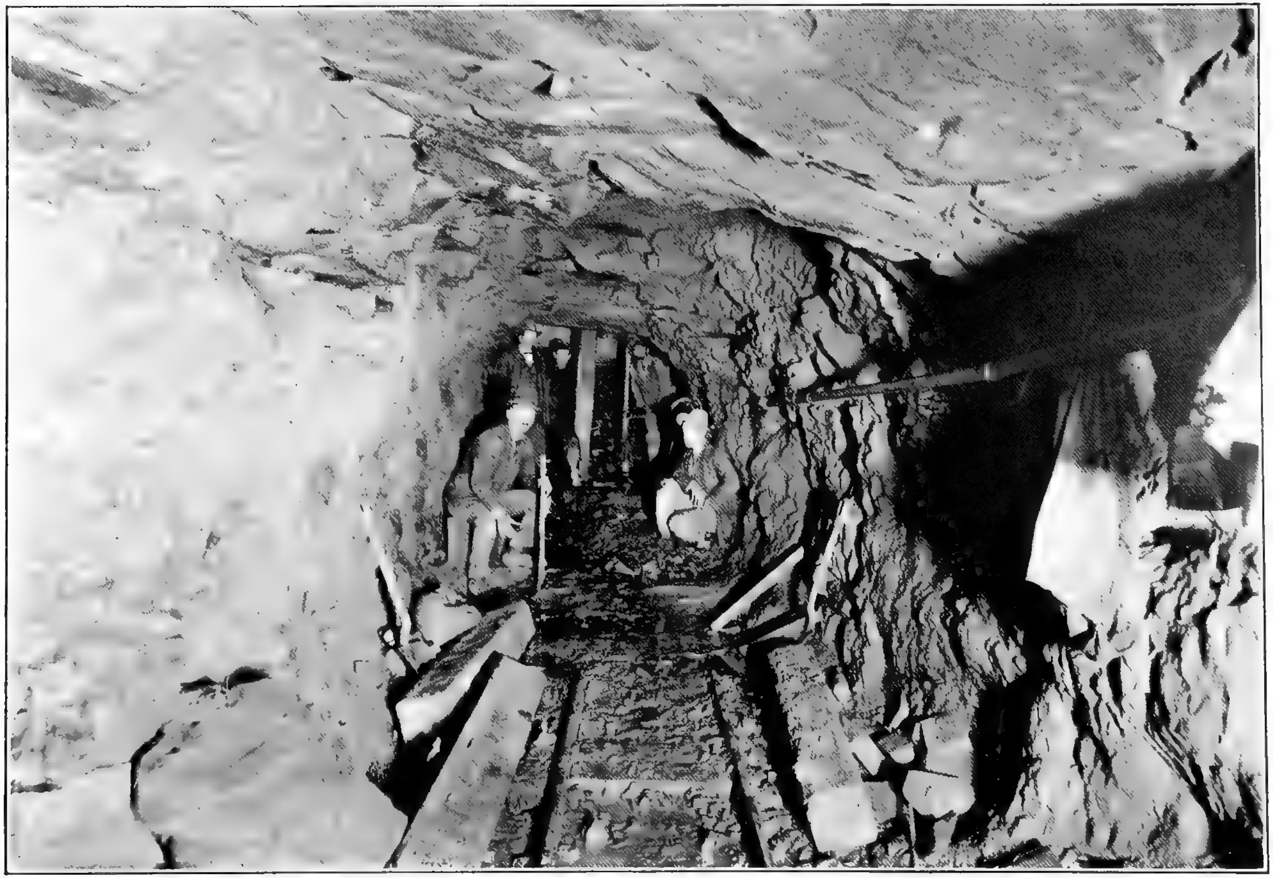
A considerable portion of the sewers in the following districts were also completed:

No. 14—Covering the territory between Pratt street on the north, Light street and Battery avenue on the east, Warren avenue on the south, and Howard street on the west;

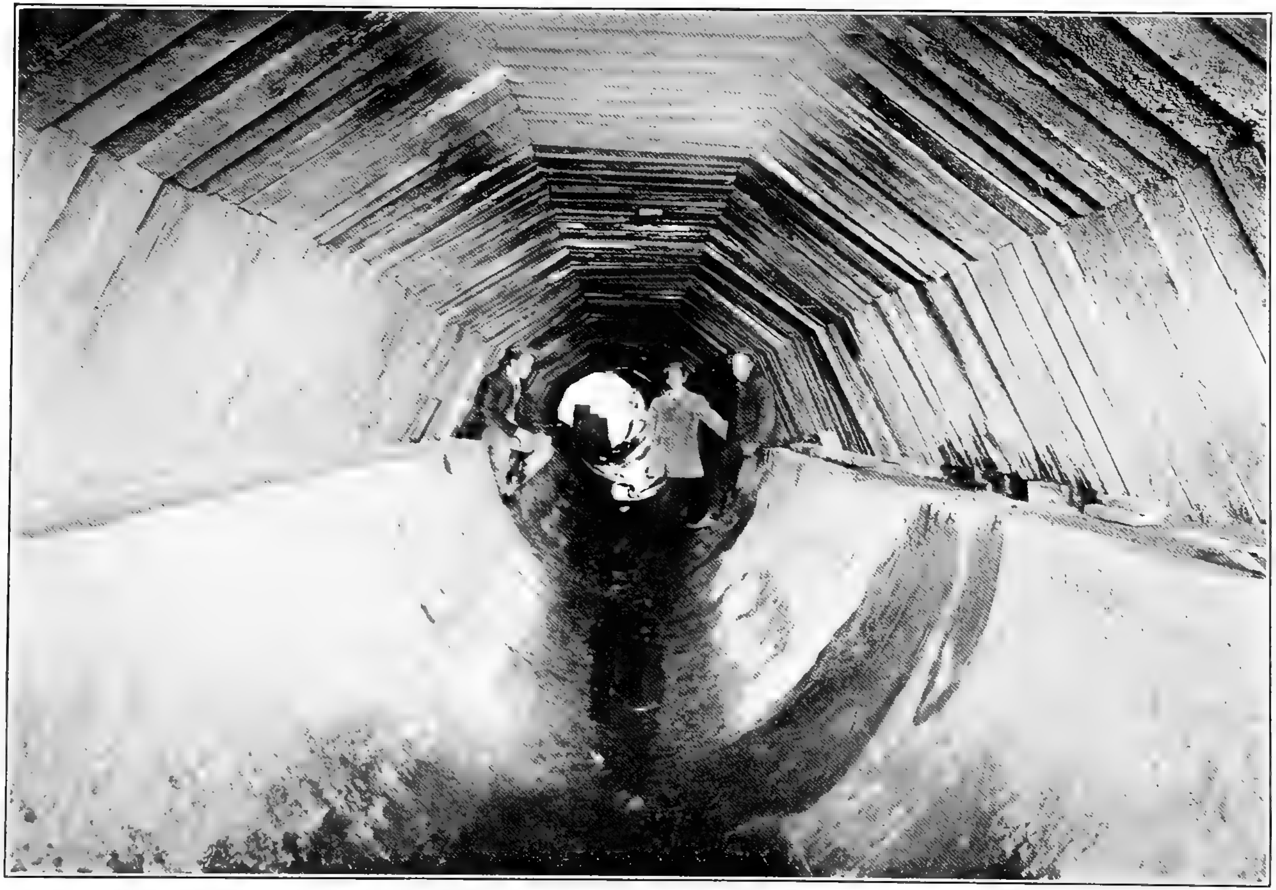
No. 19—Covering a large territory just east of the Falls and south of the High Level Interceptor, including that part of the City known as "Old Town;"

No. 34—Covering the territory between Twenty-third street on the north, Greenmount Cemetery on the east, Oliver street on the south, and Guilford avenue on the west.

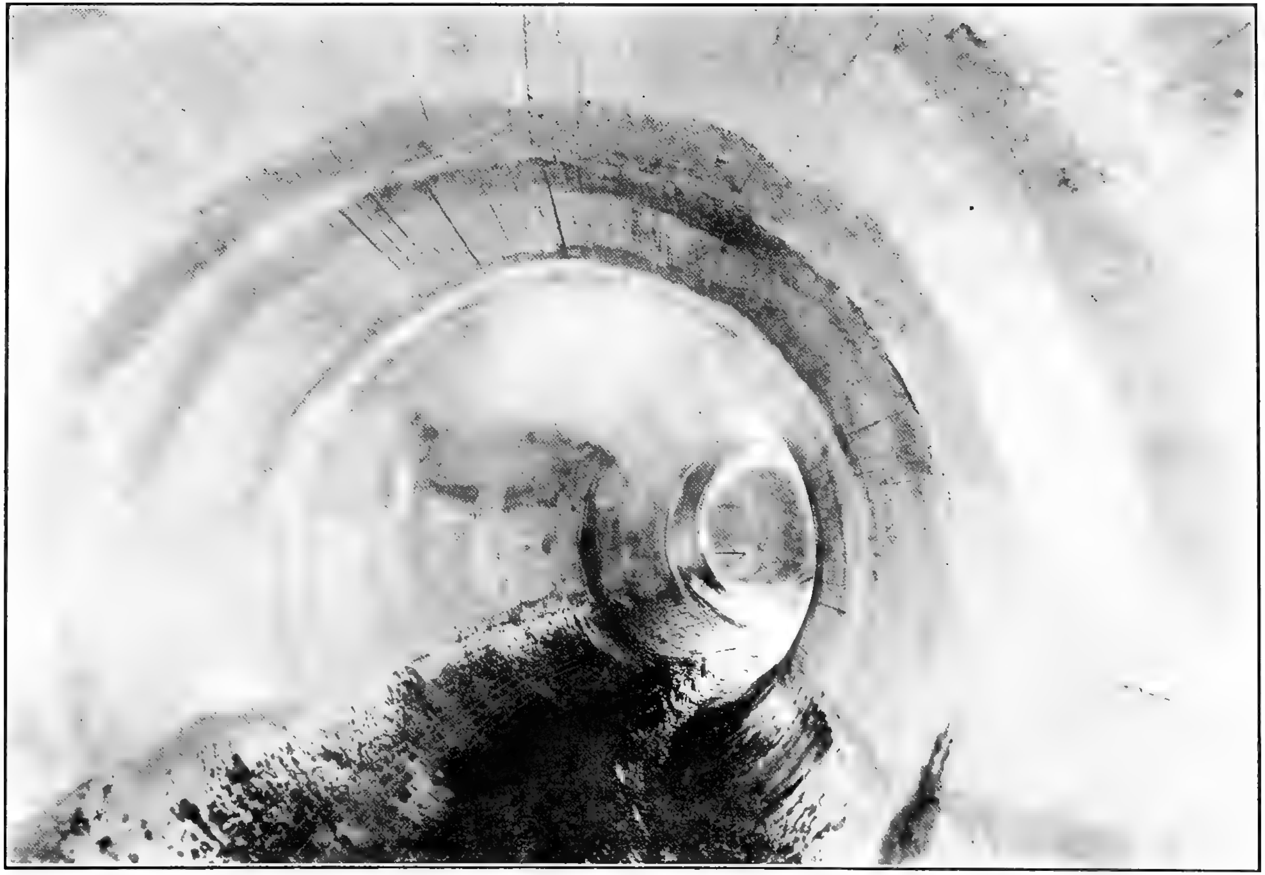
The largest sanitary sewer under construction during the year was Sections 1 and 2 of the Jones Falls Interceptor, beginning at Eager street and Clifton Place and extending to a point in Falls Road just south of North avenue. From a point just north of Preston street to Maryland avenue, this sewer runs along the easterly bank of Jones Falls, passing through the Union Station yards of the Pennsylvania Railroad and crossing under the main line tracks just west of Maryland avenue. From Eager street to Preston street, the sewer was built largely in rock tunnel. The difficulty of constructing that part of



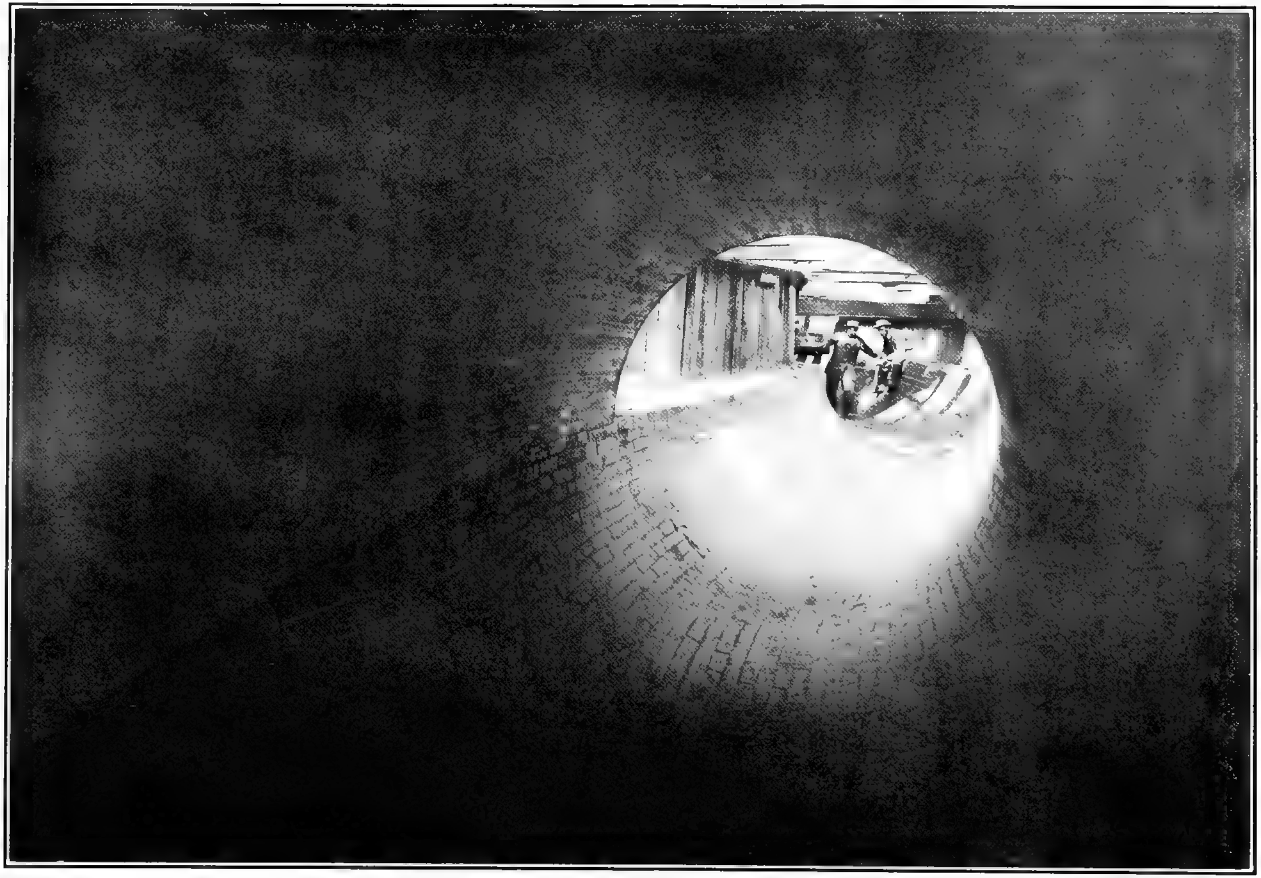
JONES FALLS SANITARY INTERCEPTOR.
Rock Tunnel.



JONES FALLS SANITARY INTERCEPTOR.
Earth Tunnel, Showing Segmental Timbering.



SUMWALT RUN STORM-WATER DRAIN.
Showing Reverse Curves.



JONES FALLS SANITARY INTERCEPTOR.
Showing Reverse Curve.

the sewer which runs through the Union Station yards was largely increased by the building of the new Union Station and the reconstruction and rearrangement of the yards, which was in progress at the same time. This sewer varies from 75 inches to 50 inches in diameter, and 3,744 feet out of a total length of 4,950 feet was completed during the year.

The McMechen Street Interceptor, which was put under contract and nearly completed during the year, runs westerly from the Jones Falls Interceptor, beginning at a point just south of North avenue and crossing under Jones Falls in an inverted siphon composed of two lines of 16-inch cast-iron pipe. This sewer is 20 to 24 inches in diameter, and runs west in McMechen and Laurens streets to Druid Hill avenue.

Storm-Water.

The most important piece of storm-water drainage work which was undertaken during the year was the construction of a relief drain running from the existing storm-water drain in Eden street, under the bed of Madison street, to Jones Falls. This drain varies from 69 to 72 inches in diameter, and a considerable part of its length is at such a depth below the surface as to require it to be built in tunnel. This work was nearly completed at the end of the year.

The public has little conception of the extensive and urgently needed relief which the installation of storm-water drains is bringing to the City by preventing flooding, eliminating thousands of objectionable cross-gutters, improvement of property, etc. If the present Commission had done nothing more than bring about the improvements caused by the building of the storm-water drains and the covering in of Jones Falls, eliminating this great nuisance, it would have performed a great and lasting service to the City. But the storm-water proposition is only a side issue compared to the sewering of the City.

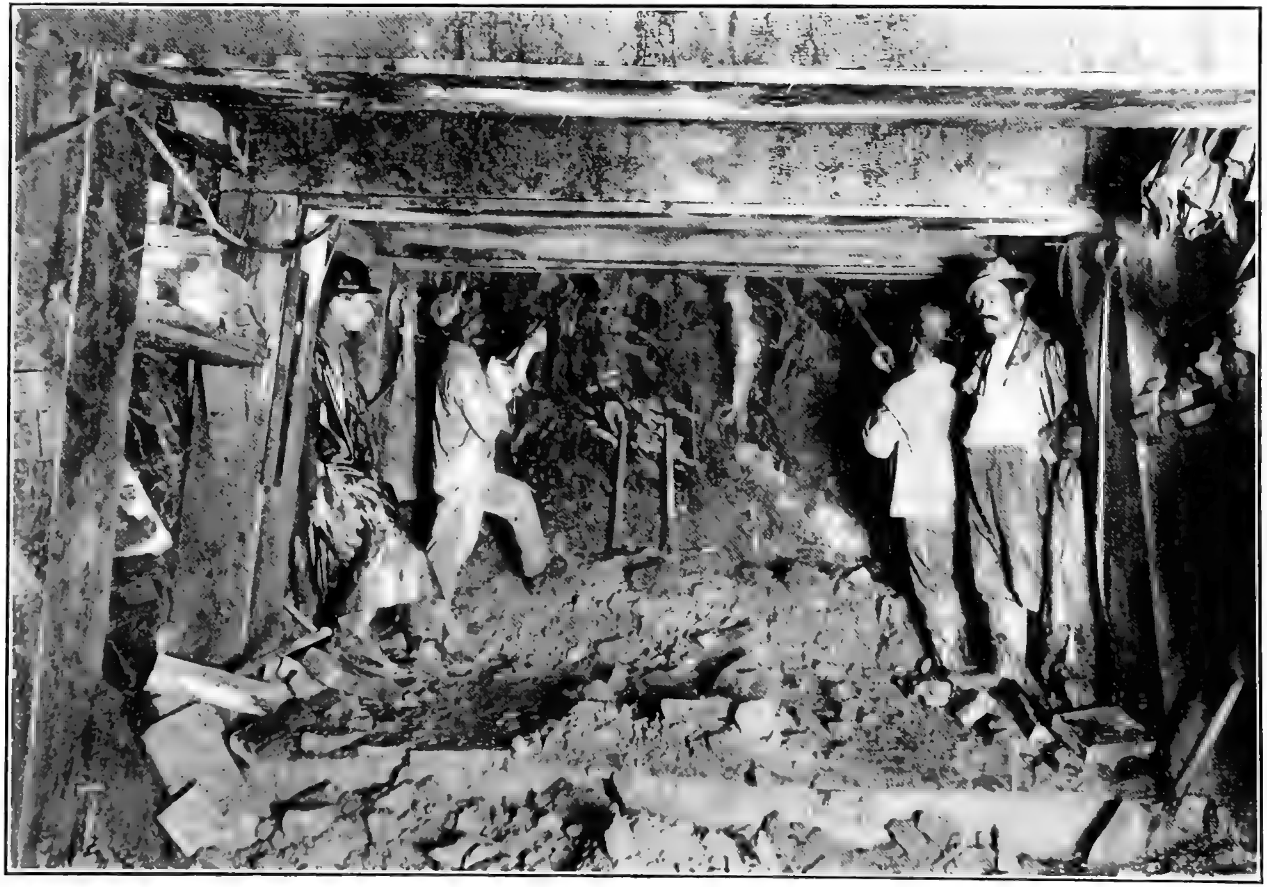
Disposal Plant.

The Disposal Plant is constructed on the unit system, in order that it may be added to as the sewers are gradually extended. The number of units at present nearly completed are sufficient to purify the sewage from about 275,000 people, or that portion of the City which will be sewered under the present loan.

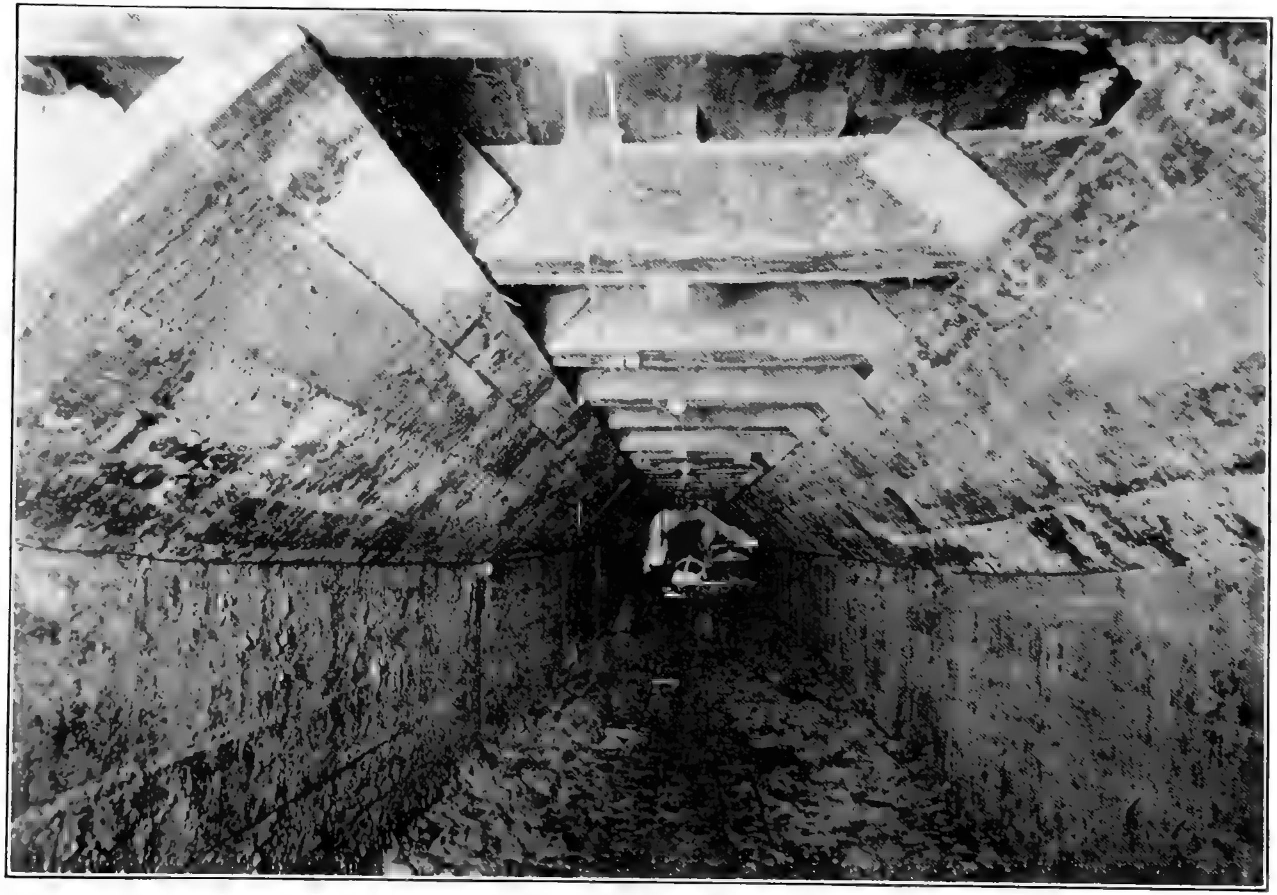
The method of treating the sewage is as follows:

At the mouth of the Outfall Sewer will be installed screens that will catch such things as sticks, rags, etc., which will be removed and burned. The sewage will then pass through the Meter-house, which will measure its flow; then through Hydrolytic Tanks, about 450 feet long, requiring eight hours for passage, a sufficient length of time to allow the solids to settle, the liquid passing on to an intercepting channel, to and through what we call the Gatehouse, which distributes it to the stone Sprinkling Filters located at a level 15 feet below the Hydrolytic Tanks, giving a hydraulic head of sufficient force to spray the sewage over these stone beds through nozzles or jets spaced 15 feet apart. The hydraulic head will be controlled by butterfly valves, causing the sprays to rise and fall, varying from close to the nozzles out to the limit of 15 feet, thus utilizing the entire surface of the stone bed, a large portion of which would be wasted if the sprays were stationary. These nozzles will throw a square spray, thereby saving additional space, which would be lost if the sprays were circular, as where circular sprays are used with the edges of the circles touching, there are triangular areas between the circles which are not used.

The spraying of the sewage through the air is essential to the aeration and purification of the sewage. As the sewage falls on these beds it trickles down through 8½ feet of broken stone varying in size from 1 inch to 2½ inches. The passing of the sewage through these beds forms a gelatine-like

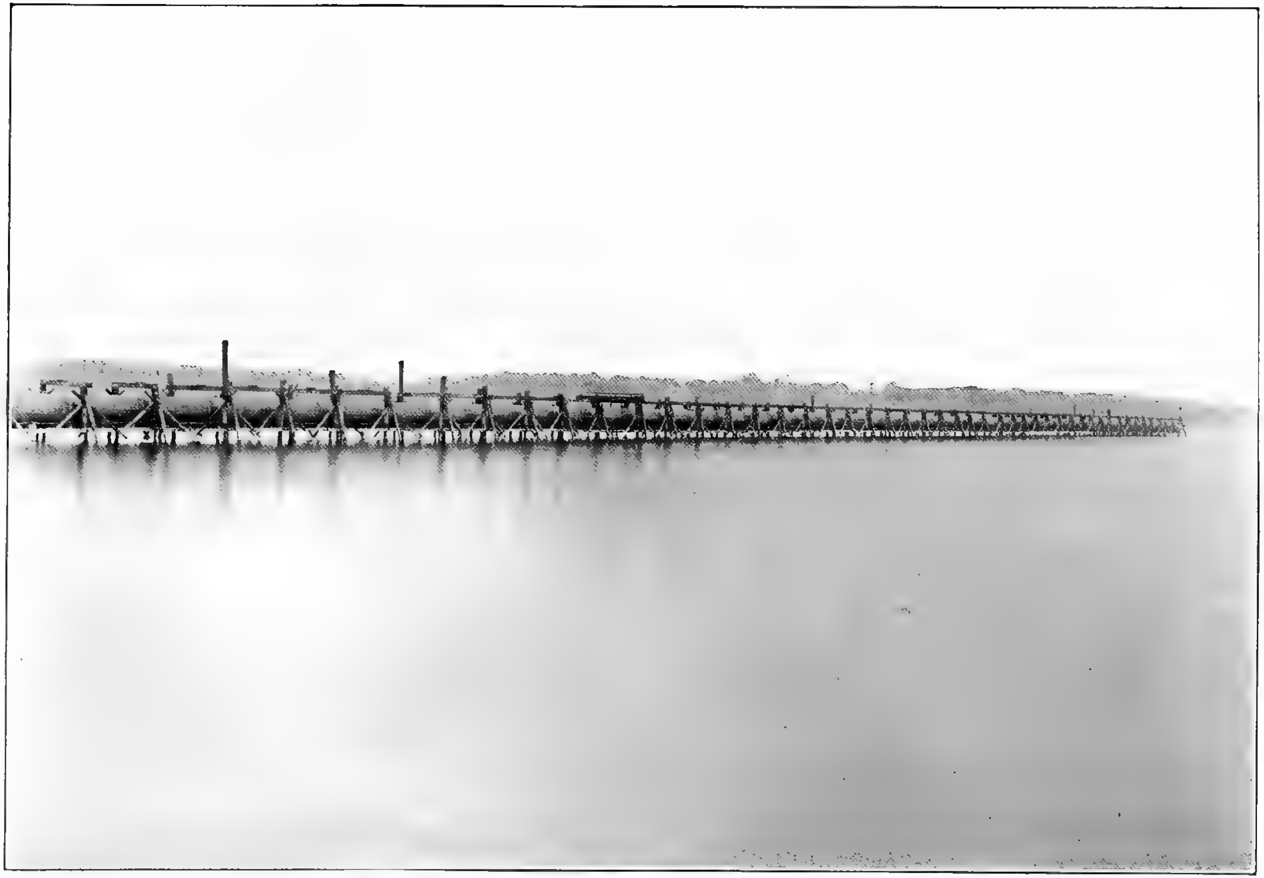


MADISON STREET STORM-WATER DRAIN.
Tunnel in Hard Clay.



MADISON STREET STORM-WATER DRAIN.

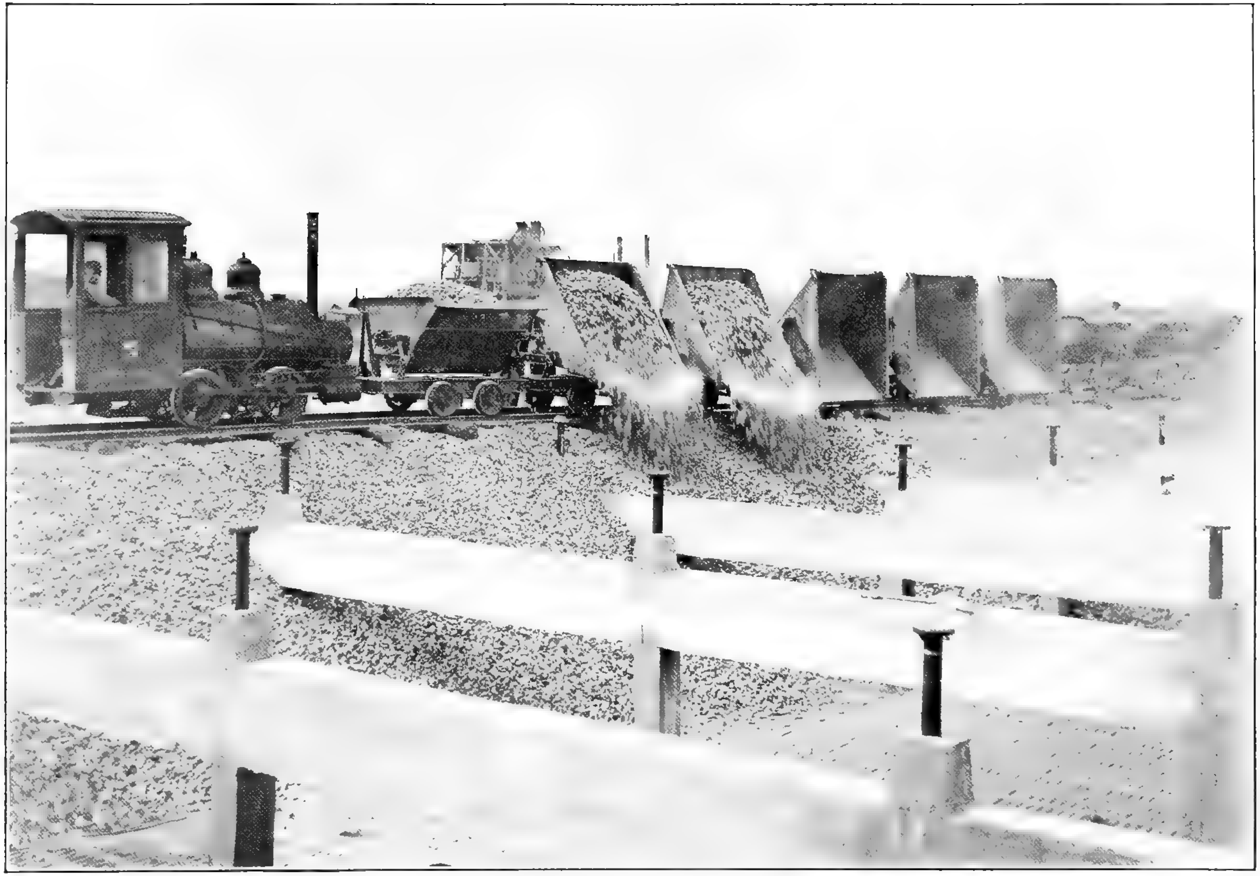
Method of Timbering Earth Tunnel. Lagging Serves as Outer Form for Concrete.



SEWAGE DISPOSAL PLANT.

Submerged Wood Stave Discharge Pipes (Double Line) Ready to Lower into Place.

These Pipes Discharge the Effluent from the Disposal Plant into Back River.



SEWAGE DISPOSAL PLANT.
Filling Sprinkling Filter Beds With Broken Stone.

film on the stones, in which certain bacteria multiply by the million, attacking and killing the injurious bacteria in the sewage. We therefore make the bacteria do the work for us by fighting each other. The sewage on reaching the bottom of these stone beds is practically pure. It is then carried by intercepting channels to a central channel under the stone beds, which finally delivers the purified sewage to the settling basins, requiring three hours to pass through. These settling basins are not for the purpose of causing additional purification, but to clarify the fluid, as there are certain mineral substances in the sewage which the bacteria do not annihilate, such as is found in the Mississippi River water, which is muddy but not injurious to drink. The sewage then passes with a drop of 18 feet through the power-house, in which turbines are placed, operated by the flow of the sewage. They in turn run dynamos which generate electricity, giving us power to light the plant, run the sludge pumps, and lift the clarified sewage to a water tower for flushing purposes. In other words, by the simple gravity flow of the sewage, it is purified and power is obtained to run and light the plant at practically no cost.

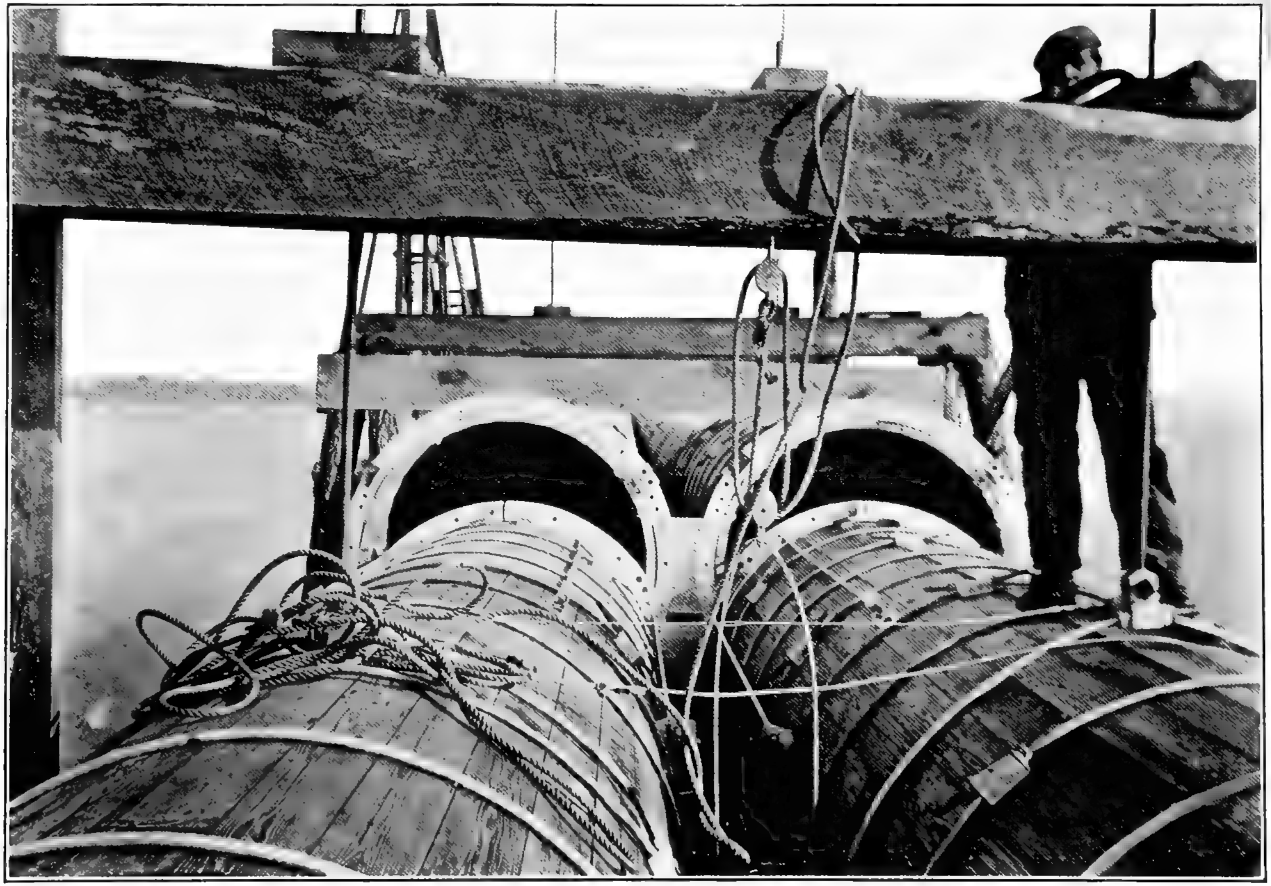
It all comes down to the fact that we are getting nearer to the laws of God than ever before, which laws man cannot improve on, but can only strive to follow. For instance: The pumps lifting the sewage from the low level to the Outfall Sewer, is the sun drawing the salt water from the sea to the cloud; the flow of the sewage through the Outfall Sewer to the Disposal Plant, is the cloud drifting through the air; the spraying of the sewage over the stone beds, is the rain falling from the cloud to the earth; the trickling of the sewage down through the stones is the rain sinking into the earth; the purified sewage coming out into the settling basins, is the spring water bubbling out of the ground, and the electric light produced by the flow of the sewage is the sunshine after the clouds have passed.

The sewers completed and under contract, about 160 miles, if placed end to end, would almost reach from Baltimore to New York, and a portion of them are large enough to drive through in automobiles.

I feel safe in stating that the entire built-up portion of the City will be completely sewered and in operation in 1914, the time originally stated, provided we are allowed to continue in the rapid manner in which we have so far prosecuted the work.

Respectfully submitted,

Calvin W. Hendrick,
Chief Engineer.



JOINTS IN WOOD STAVE PIPE.

APPENDIX "B"

PROVIDENCE, R. I., April 14, 1910.

SEWERAGE COMMISSION OF THE CITY OF BALTIMORE,
PETER LEARY, JR., *Brig.-Gen'l. U. S. A., Chairman,*
Baltimore, Md.

GENTLEMEN:

Complying with the request contained in the letter of W. D. Platt, Chairman *pro tem.*, of the Sewerage Commission, dated March 2, 1910, "that the Advisory Engineers shall inspect and report on the work completed since their last inspection; also on certain plans prepared for future work," we have made the inspection requested and respectfully report as follows:

On March 17, 1910, we met at your office in Baltimore, conferred with Mr. Calvin W. Hendrick, Chief Engineer, examined certain plans prepared for future work, which he brought to our attention, and under his guidance visited the Sewerage Pumping Station in the city and the sewage disposal works near Back River.

At the pumping station, we found that the masonry walls were nearly completed. They had a substantial appearance and we believe that they will support the building and machinery to be placed thereon.

At the sewage disposal works, we noted that by far the larger part of the masonry and piping had been completed, and that the placing of the crushed stone in the sprinkling filters had been begun. We saw the completed masonry, as well as the materials which were entering into the construction of the works in progress. We examined the under drains of the sprinkling filters, which are moulded in the concrete base and covered with perforated flat tiles which form the floor on which the crushed stone of the filters is to be placed, also the crushed stone, a small part of which had been put in place.

All of the work which we examined appeared to be thoroughly well done. We were especially pleased with the under drains of the sprinkling filters, and believe these drains formed in the concrete and covered with perforated flat tiles are far better than drains made of half round tiles laid upon a flat floor of concrete, such as have been generally used heretofore. The crushed stone which had been placed in the sprinkling filters was substantially in accordance with our former recommendations as to size and quality.

One of the plans brought to our attention was a plan of a filter bed for the disposal of sludge, designed by Mr. Hendrick, and while on the ground we examined the site selected for this bed. In making the design, Mr. Hendrick was guided in part by information which he had received as to the successful use of a similar bed for the disposal of sludge much like that which would be discharged upon a bed from the works at Baltimore. The bed is well designed and as the disposal of sludge is one of the most difficult problems connected with sewage disposal and the information which he has obtained appears to be trustworthy, we recommend the construction of the bed.

The other plans brought to our attention were a series of sketches of screens, and while at the disposal works we examined the chambers built to receive them. As the subject of screening is a very important one and as the plans were not beyond the tentative stage, we devoted the greater part of March 18, the second day of our visit, to a conference with Mr. Hendrick upon this subject, and while there are as yet no final plans for us to approve or disapprove, we are of the opinion that it is desirable to proceed substantially along the following lines:

First, to provide coarse screens for the screen chamber at the end of the outfall sewer to remove from the sewage coarse materials, such as rags, paper, corks, half lemons, toys, sticks and similar substances which might clog the pumps used for pumping sludge from the hydrolytic and sludge digesting tanks.

Second, to provide a screen between the hydrolytic tanks and the sprinkling filters fine enough to remove the comparatively small amount of suspended matters coarse enough to cause trouble by clogging the nozzles used for spraying the sewage upon the crushed stone of the sprinkling filters.

It is not customary to install a screen between hydrolytic tanks and sprinkling filters, because nearly all of the suspended matters will be removed from the sewage by the first set of screens and by the separation of the suspended matters from the sewage which takes place in the hydrolytic tanks by sedimentation and flotation. Some suspended matters coarse enough to clog the sprinkling nozzles will, however, unavoidably be carried along with the sewage, and we believe that a screen, nearly automatic in operation and fine enough to remove such matters will be a valuable feature of the works.

The most efficient nozzle for spraying the sewage uniformly over the whole surface of the crushed stone appears to be one that is liable to clog rather easily and require considerable labor to keep it in efficient working condition unless some such fine screen as has been proposed is used.

We have not reached definite conclusions as to the best type of coarse screen for use at the end of the outfall sewer. There are three types of screens available for this place, two of which are in common use.

In one type, the screen is made of parallel, fixed bars, from three-quarters of an inch to one inch apart, generally placed at an inclination, with their tops resting against a platform above the surface of the sewage. In operating such screens, the coarse material intercepted is lifted by rakes to the platform. Such screens are especially adapted to small sewerage systems where they can be easily raked by hand with rakes of ordinary size. At Baltimore, the depth of sewage against the screens will be at times as much as nine feet and the platform must be somewhat higher than the surface of the sewage, so that to rake such screens by hand will be difficult on account of the long handles required for the rakes.

The screen with inclined, fixed bars has the advantage over other types that it is more simple and has the further advantage over a screen that is lifted that no large substance can get past it; moreover, a screen of this kind can be placed longitudinally in the chambers already provided at the end of the outfall sewer and in this way provide a larger screen area than it is feasible to provide in those chambers by any other method. The objection to this type of screen is the difficulty of raking unless some efficient rake operated by power is devised.

The second type of screen which is much used on large works, especially where the sewers are far below the surface of the ground, consists of screen cages which can be lifted to the level of the platform above the surface of the sewage and easily cleaned while they are up. Such screens are usually placed one behind the other, so that when one screen is up the other remains below in use, but notwithstanding this precaution some large substances are liable to get by the screens; moreover, the effective screen area of such cages in the screen chamber at Baltimore will be considerably less than that of the longitudinal fixed screens above described.

The third type which may be considered consists of a revolving screen turning upon an axis so placed that each part of the screen at each revolution is brought above the surface of the sewage where it may be cleaned.

We think is advisable that further studies be made of these three types of screens and especially that an endeavor be made to design a simple and efficient rake for cleaning a screen with inclined, fixed bars. If such a rake can be devised, we should prefer this type of screen.

It is our judgment that a revolving screen should be designed for the fine screen between the hydrolytic tanks and the sprinkling filters and we believe that a screen of this type can be constructed which will work satisfactorily. Provision should be made for cleaning this screen with a jet or stream of water and the material washed from it should be conveyed through a pipe back to the upper end of the lower compartment of a hydrolytic tank, so that the solid particles will again have an opportunity to settle or float to the surface while the sewage is passing through the tank.

The screening of the sewage is an important part of the work, the two essential features of which are to thoroughly screen the sewage at the least cost, and to accomplish these results, the screens should be skillfully designed.

We will send a separate communication to Mr. Hendrick, giving at length our suggestions as to the technical features to be considered in making designs of these various types of screens.

We are pleased to note the progress which has been made in your great work since the date of our last inspection and we believe the progress has all been in the right direction.

Respectfully presented,

SAMUEL M. GRAY,
FREDERIC P. STEARNS,
Advisory Engineers.

APPENDIX "C"

GRAND JURY ROOM
CRIMINAL COURT OF BALTIMORE.

BALTIMORE, January 4, 1911.

E. EDMUNDS FOSTER, ESQ.,
Foreman of the Grand Jury,
September Term, 1910.

SIR:

About the time that this September term—1910—of the Grand Jury for Baltimore City, convened, there existed a certain condition that seemed to demand an investigation by your Sanitary Committee. During the heated term of the summer months, and especially towards the end of that period, the bad odors from the harbor were most persistent. Inquiries were made of the Health Department about this seeming nuisance and we were told that conditions were not as bad as would be supposed. In fact, the intensity of these odors was but an index of a beneficial decomposition that relieved the danger to the health of the City, rather than otherwise, and it was suggested that even this disagreeable feature of odor would be relieved in the near future. This inquiry brought to our attention certain details of the new Sewerage System that was being built, and naturally led to a desire to investigate this work. We let it be known that an inspection would be agreeable to this Grand Jury, and the Sewerage Commission willingly entertained the idea. The Commission placed everything at our convenience and the work proved not only interesting but profitable. Few of us had realized the magnitude of this undertaking, and what had so far been accomplished. The simplicity of the system itself, and the approximation to nature's own methods in the disposal and purification of the sewerage of a large city like Baltimore, was a revelation. The big engineering task that was being accomplished and yet the very evident economy that was being practiced without detriment to any detail, was remarkable and we feel proud to think that when the work is finished, Baltimore will have a Sewerage System that will be a criterion for every other city in the world. As a scientific proposition, it is evident, that the work has not only been carefully planned, but excellently executed. We are pleased to give it our earnest approval.

We understand that another loan of $10,000,000 will be asked at the coming spring election. We are sure that the citizens of Baltimore will see that this loan is enacted. To stop the work on this System would be a great error and a blot on our city. Any disorganization of the present force would be a serious inconvenience in the ultimate accomplishment of the task, and a failure to provide the loan would be an almost criminal neglect.

The Chief Engineer seems to be not only a man of great capacity, but his knowledge of details, and his plans for a system that will take care of the Sewerage problem for the whole city, would justify any endorsement that we could make of him.

The character of the Commission itself, and the earnest harmony that exists between the individual Commissioners and the responsible head of this enterprise, persuades us that when the work is finally done, the people of Baltimore will be satisfied.

Respectfully submitted,

James E. Hancock,
Charles D. Reid,
S. H. Foxwell,
Walter P. Wright,
S. I. Hamburger.

TABLES

TABLE No. 1.

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
Albert M. Brosius.....	First Assistant.........	Jan. 2, 1906.	
Ezra B. Whitman.....	Division Engineer......	Jan. 2, 1906.	
Oliver W. Connet......	Division Engineer......	Jan. 2, 1906.	
Herbert M. Knight....	Division Engineer......	Jan. 2, 1906.	Resigned August 1, 1910.
Thomas D. Pitts.......	Division Engineer	June 4, 1906.	
Alfred H. Hartman....	Division Engineer......	Jan. 15, 1906.	Promoted from Assistant to Division Engineer August 15, 1910.
A. F. Nagle...........	Mechanical Engineer...	May 13, 1907.	
J. Fletcher Apsey......	Asst. to Div. Engineer.	Jan. 15, 1906.	
Charles A. Emerson, Jr.	Asst. to Div. Engineer.	Jan. 8, 1906.	Resigned September 23, 1910.
Robert B. Morse.......	Asst. to Div. Engineer.	Dec. 5, 1905.	Promoted from Asst. Eng. "AA" Jan. 1, 1910, resigned October 18, 1910.
W. A. Megraw.........	Asst. to Div. Engineer.	Dec. 3, 1906.	Promoted from Chief Draftsman January 1, 1910, to Asst. Eng. "AA," promoted from Asst. Eng. "AA" Dec. 1, 1910.
H. C. McRae...........	Asst. to Div. Engineer.	Jan. 21, 1907.	Promoted from Asst. Eng. "A" Dec. 1, 1910.
R. L. Burwell..........	Asst. to Div. Engineer.	June 24, 1907.	Resigned June 15, 1910, as Asst. Eng. "A," re-appointed Dec. 1, 1910, as Asst. to Div. Eng.
John J. Frederick.....	Secretary..............	Oct. 1, 1905.	
Levin J. Houston, Jr...	Asst. Engineer "A"....	Jan. 15, 1906.	
Leander Dorsey........	Asst. Engineer "A"....	Jan. 22, 1906.	Resigned August 1, 1910.
Raymond H. Williams..	Asst. Engineer "A"....	Mar. 1, 1906.	
Elliott H. Burwell.....	Asst. Engineer "A"....	Jan. 15, 1906.	
Covington K. Allen....	Asst. Engineer "A"....	June 1, 1907.	

TABLE No. 1—*Continued.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

Name.	Title.	Entered Service.	Remarks.
Henry S. Shryock.....	Asst. Engineer "A"....	May 1, 1906.	
Arthur C. Toner......	Asst. Engineer "A"....	Jan. 15, 1906.	
G. W. C. Whiting.....	Asst. Engineer "A"....	Jan. 15, 1906.	Resigned March 7, 1910.
August E. Falkenberg...	Asst. Engineer "A"....	Feb. 1, 1906.	
Henry S. Regester, Jr..	Asst. Engineer "B"....	Jan. 15, 1906.	
Harry F. Schaefer.....	Asst. Engineer "B"....	June 20, 1907.	
Vinton D. Cockey.....	Asst. Engineer "B"....	Aug. 19, 1907.	
John Moore, Jr........	Asst. Engineer "B"....	May 16, 1907.	Resigned March 16, 1910.
Frank J. Parran.......	Asst. Engineer "B"....	May 28, 1907.	
Ralph Hutchins........	Asst. Engineer "B"....	Feb. 1, 1906.	
William L. Williams....	Asst. Engineer "B"....	June 27, 1907.	
F. W. Caspari..........	Asst. Engineer "B"....	Feb. 1, 1906.	Promoted from Draftsman "A" May 1, 1910.
Edward F. Davis......	Inspector "A".........	Dec. 24, 1906.	
Charles S. York.......	Inspector "A".........	Nov. 7, 1906.	
Frederick S. Jackson..	Inspector "A".........	July 2, 1907.	
John H. Sothoron......	Inspector "A".........	July 5, 1907.	
John J. Neal..........	Inspector "A".........	Nov. 9, 1906.	
Milton J. Ruark........	Inspector "A".........	Jan. 22, 1906.	
John Martin...........	Inspector "A".........	Mar. 3, 1910.	
Charles I. Hammond....	Inspector "B".........	Nov. 7, 1906.	
Aulbin D. Tapscott.....	Inspector "B".........	Nov. 19, 1906.	
William H. Bell........	Inspector "B".........	Dec. 19, 1906.	Resigned Nov. 15, 1910.
George T. Robinson....	Inspector "B".........	June 1, 1907.	
Stephen A. Lusby......	Inspector "B".........	April 6, 1907.	Resigned June 7, 1910, reappointed Oct. 1, 1910.

TABLE No. 1—*Continued.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
Preston Bowles	Inspector "B"	June 20, 1907.	Resigned Feb. 7, 1910.
A. E. B. Jones	Inspector "B"	Jan. 15, 1906.	
Henry A. Albert	Inspector "C"	June 1, 1907.	Resigned June 7, 1910, reappointed Aug. 16, '10.
Alexander Dick	Inspector "C"	May 3, 1909.	Deceased Feb. 15, 1910.
William A. Brogden	Inspector "C"	Nov. 7, 1906.	Resigned Nov. 15, 1910.
John F. Garrett	Inspector "C"	Nov. 16, 1906.	
Horace A. Browne	Inspector "C"	July 5, 1907.	
Walter J. Caple	Inspector "C"	July 5, 1907.	
Karl E. G. Kaufman	Inspector "C"	Jan. 15, 1906.	
Henry Kelly	Inspector "C"	July 17, 1907.	
Albert J. Boyle	Inspector "C"	Aug. 8, 1907.	
F. DeWolf Theobald	Inspector "C"	Aug. 9, 1907.	
James R. Carroll	Inspector "C"	Aug. 22, 1907.	Resigned June 7, 1910.
J. Hamilton Davidson	Inspector "C"	Oct. 9, 1907.	
A. S. Bartholomaei	Inspector "C"	Oct. 9, 1907.	
H. N. O'Brien	Inspector "C"	Oct. 11, 1907.	Resigned Aug. 6, 1910.
John C. Strohm	Inspector "C"	Jan. 15, 1906.	
Samuel L. Thomsen	Inspector "C"	Oct. 21, 1907.	Resigned April 30, 1910.
George E. Schaeffer	Inspector "C"	Aug. 11, 1908.	
William J. Boyle	Inspector "C"	Apr. 16, 1907.	
George B. Roberts	Inspector "C"	June 23, 1909.	
William Byrd	Inspector "C"	June 1, 1907.	
F. D. Christhilf	Inspector "C"	July 7, 1909.	
E. B. Richards	Inspector "C"	Jan. 15, 1906.	

TABLE No. 1—*Continued.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

Name.	Title.	Entered Service.	Remarks.
J. H. Gambrell	Inspector "C"	Jan. 15, 1906.	
Martin W. Garrett	Inspector "C"	July 19, 1909.	
Lawrence H. Francis	Inspector "C"	Jan. 15, 1906.	
John Lynch	Inspector "C"	June 1, 1909.	Promoted from Rodman "B" April 16, 1910.
Frank H. Firoved	Draftsman "A"	Jan. 23, 1906.	
J. Elmer Shepperd	Draftsman "A"	July 2, 1906.	
Claude A. Murphy	Draftsman "A"	Jan 15, 1906.	Promoted from Draftsman "B" May 1, 1910.
E. V. Hax	Draftsman "B"	Jan. 15, 1906.	
Robert R. Cassilly	Draftsman "B"	Apr. 19, 1906.	Resigned June 23, 1910.
C. Boone Sadler	Draftsman "B"	Aug. 1, 1907.	
George W. Townsend	Draftsman "B"	Nov. 18, 1907.	
Clarence G. Harig	Draftsman "C"	Apr. 20, 1908.	
Joseph H. Straus, Jr.	Draftsman "C"	June 9, 1908.	
Harry J. Armstrong	Draftsman "C"	June 9, 1908.	
Robert Dall, Jr.	Draftsman "C"	July 18, 1910.	
Isadore Behrman	Draftsman "C"	July 22, 1910.	
Thomas D. Conn	Draftsman "C"	Nov. 21, 1910.	
Edward G. Birge	Bacteriologist	June 10, 1907.	Resigned August 16, 1910.
George J. Armeling	Asst. Chemist	Aug. 8, 1907.	
William Wagner	Rodman "A"	Jan. 15, 1906.	
R. Taylor Tunstall	Rodman "A"	Jan. 15, 1906.	
J. Carroll Daily	Rodman "A"	Feb. 1, 1906.	
H. Howard Williams	Rodman "A"	Sept. 21, 1906.	
J. Milton Knight	Rodman "A"	Aug. 4, 1908.	
Robert Rumbold	Rodman "A"	Feb. 1, 1906.	

TABLE No. 1—*Concluded.*

PERSONNEL OF CHIEF ENGINEER'S STAFF.

NAME.	TITLE.	ENTERED SERVICE.	REMARKS.
William F. Dolliver	Rodman "A"	July 7, 1909.	
J. Wightman Cleaveland	Rodman "A"	Jan. 15, 1906.	Promoted from Rodman "B" April 15, 1910.
Gustav J. Requardt	Rodman "A"	June 23, 1909.	Promoted from Rodman "B" May 1, 1910.
Harry G. Maynard	Rodman "A"	June 23, 1909.	Promoted from Rodman "B" May 1, 1910.
D. B. Stewart, Jr.	Rodman "A"	Aug. 2, 1909.	Promoted from Rodman "B" May 1, 1910.
L. Carroll Miller	Rodman "A"	Jan. 25, 1906.	Promoted from Stenographer Nov. 16, 1910.
Charles H. Brooks	Rodman "B"	Nov. 16, 1907.	Promoted from Night Attendant Jan. 1, 1910.
Wilford W. Herbert	Rodman "B"	July 16, 1906.	
Conrad F. Kraeter	Rodman "B"	Sept. 20, 1906.	
Thomas W. Sasscer	Rodman "B"	May 20, 1908.	
Paul Wroth	Rodman "B"	May 19, 1908.	
John Daugherty	Rodman "B"	May 17, 1909.	
George E. Hilton	Rodman "B"	June 9, 1908.	Resigned Jan. 1, 1910.
Harry M. Webb	Rodman "B"	June 1, 1909.	
Geo. F. Weighardt	Rodman "B"	July 7, 1909.	Resigned March 16, 1910.
H. W. Johenning	Rodman "B"	June 24, 1908.	
Ernest A. Taylor	Rodman "B"	June 1, 1907.	Promoted from Laboratory Assistant Jan. 1, 1910, resigned Aug. 1, 1910.
Edgar C. Hasson	Stenographer	July 1, 1907.	
G. Archer Hays	Stenographer	Sept. 3, 1907.	
Adam W. Gerlach	Stenographer	June 16, 1909.	
J. L. Pennington	Stenographer	July 23, 1909.	
Victor Klausmeyer	Stenographer	Dec. 5, 1910.	
Maurice F. Rodgers	Record Clerk	Dec. 1, 1905.	
Henri H. Smith	Clerk	Aug. 18, 1910.	

TABLE No. 2.

STATEMENT OF CONTRACTS LET PRIOR TO 1910.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PROPORTION OF WORK COMPLETED DEC. 31, 1910.
Wash Borings No. 1..........	July 2, 1906.	B. F. Smith & Bro.	Completed July 28, 1906.
Testing Plant................	Oct. 17, 1906.	Malcolm W. Hill Co.	Completed July 1, 1907.
Laboratory	Oct. 18, 1906.	Wm. Kirkpatrick.	Completed Feb. 1, 1907.
Storm Water No. 1...........	Oct. 18, 1906.	M. A. Talbott Co.	Completed April 14, 1908.
Sanitary Sewers—Walbrook....	Oct. 29, 1906.	M. A. Talbott Co.	Completed June 27, 1907.
Outfall Sewer, Section No. 1..	Dec. 7, 1906.	M. A. Talbott Co.	Completed August 1, 1909.
Outfall Sewer, Section No. 2..	Dec. 7, 1906.	M. A. Talbott Co.	Completed August 6, 1908.
Sewage Pumping Plant Mach'y.	Dec. 12, 1906.	Bethlehem Steel Co.	86%
W. L. L. Int., Section No. 1..	May 1, 1907.	Metropolitan Contr. Co.	Completed March 26, 1908.
W. L. L. Int., Section No. 2..	May 1, 1907.	Metropolitan Contr. Co.	Completed March 26, 1908.
Outfall Sewer, Section No. 3..	May 4, 1907.	J. Connelly Const. Co.	Completed June 7, 1909.
Outfall Sewer, Section No. 7..	May 4, 1907.	J. Connelly Const. Co.	Completed Dec. 19, 1908.
Outfall Sewer, Section No. 8..	May 4, 1907.	J. Connelly Const. Co.	Completed Nov. 1, 1908.
Outfall Sewer, Section No. 9..	May 4, 1907.	A. F. Helm.	Completed Oct. 13, 1908.
Outfall Sewer, Section No. 6..	May 28, 1907.	David Peoples.	Completed Oct. 16, 1908.
Storm-Water No. 2...........	May 28, 1907.	David Peoples.	Completed May 11, 1909.
Storm-Water No. 3..........	May 28, 1907.	David Peoples.	Completed May 15, 1909.
H. L. Int., Section No. 1......	May 29, 1907.	M. A. Talbott Co.	Completed Nov. 5, 1908.
H. L. Int., Section No. 2......	May 29, 1907.	M. A. Talbott Co.	Completed May 1, 1909.
Outfall Sewer, Section No. 4.	May 29, 1907.	M. A. Talbott Co.	Completed March 17, 1909.
Outfall Sewer, Section No. 5..	May 29, 1907.	M. A. Talbott Co.	Completed August 1, 1909.

TABLE No. 2—*Continued.*

STATEMENT OF CONTRACTS LET PRIOR TO 1910.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PROPORTION OF WORK COMPLETED DEC. 31, 1910.
Outfall Sewer, Section No. 10.	June 10, 1907.	J. Connelly Con. Co.	Completed Nov. 1, 1908.
	NOTE.—This contract was first awarded to J. Erwin Hillpot, but he was unable to furnish satisfactory bond and the contract was reawarded to the J. Connelly Construction Company, the next lowest bidder.		
Sewage Disposal Plant, Clearing and Grubbing Disposal Area	July 8, 1907.	Lane Bros. Co. & Jones.	Completed Sept. 1, 1909.
	NOTE.—This contract was awarded on April 24 to J. Erwin Hillpot, but he was unable to furnish a satisfactory bond and the work was readvertised.		
Digging Test Well on site of Sewage Pumping Station....	July 29, 1907.	Metropolitan Contr. Co.	Completed August 27, 1907.

TABLE No. 2—*Continued.*

STATEMENT OF CONTRACTS LET PRIOR TO 1910.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PROPORTION OF WORK COMPLETED DEC. 31, 1910.
W. L. L. Int., Section No. 3..	Feb. 28, 1908.	Metropolitan Contr. Co.	Completed Oct. 30, 1908.
E. L. L. Int., Section No. 1..	May 8, 1908.	T. J. O'Connell........	Completed May 15, 1909.
E. L. L. Int., Section No. 2..	May 8, 1908.	T. J. O'Connell........	Completed May 15, 1909.
Grading Manderson lot......	May 8, 1908.	Gustavus Heckel	Completed June 29, 1908.
Sewage Pumping Station, Superstructure	May 9, 1908.	Noel Construction Co..	71%
Sewage Pumping Station, Substructure..................	May 9, 1908.	Noel Construction Co..	98%
Storm Water Contract No. 4..	June 17, 1908.	Reilly & Riddle........	Completed March 16, 1909.
Roadway, Willis avenue......	Aug. 7, 1908.	L. B. McCabe..........	Completed Nov. 30, 1908.
Storm Water Contract No. 5..	Sept. 17, 1908.	David Peoples	Completed Jan. 23, 1909.
Roadways on Baltimore Brick Company's property	Sept. 28, 1908.	Thos. Mullan	Completed Dec. 7, 1908.
W. L. L. Int., Section No. 4..	Oct. 28, 1908.	Metropolitan Contr. Co.	Completed July 10, 1909.
Force Main	Nov. 2, 1908.	Warren F. Brenizer Co.	Completed Oct. 12, 1909.
Force Main Sewer..........	Nov. 4, 1908.	Ryan & Reilly	Completed Sept. 30, 1909.
Disposal Works	Nov. 4, 1908.	New York Continental Jewell Filtration Co..	Completed Dec. 23, 1910.
Storm Water Contract No. 6..	Dec. 31, 1908.	Booth & Flinn..........	Completed Jan. 28, 1910.
Filter Stone for Sewage Disposal Works	Dec. 31, 1908.	Fisher & Carozza.......	68%
Sanitary Contract No. 35, Lateral Sewers, District No. 26.	Mar. 6, 1909.	T. Wallace Reilly.......	Completed Oct. 7, 1909.

TABLE No. 2—*Concluded.*

STATEMENT OF CONTRACTS LET PRIOR TO 1910.

CONTRACT.	DATE OF CONTRACT.	NAME OF CONTRACTOR.	PROPORTION OF WORK COMPLETED DEC. 31, 1910.
Sanitary Contract No. 37, Sewage Disposal Works, Water Tanks and Tower..........	Feb. 19, 1909.	Horace E. Horton (Chicago Bridge and Iron Works).............	Completed Sept. 1, 1909.
Sanitary Contract No. 38, Lateral Sewers, District No. 28.	April 19, 1909.	Ryan & Reilly..........	Completed Nov. 10, 1909.
Sanitary Contract No. 39, Lateral Sewers, District No. 30.	April 15, 1909.	James Ferry & Sons....	Completed Sept. 25, 1909.
Sanitary Contract No. 40, Forest Park Sewage Disposal Works................	Sept. 15, 1909.	Lane Bros. Co. & Jones.	Completed Oct. 25, 1910.
Sanitary Contract No. 41, Trunk Sewers, District No. 48	Sept. 10, 1909.	T. Wallace Reilly......	Contract abandoned June 15, 1910. 72% of work completed.
Sanitary Contract No. 42, Jones Falls Interceptor, Section No. 1	Sept. 22, 1909.	M. A. Talbott Co......	Completed Oct. 15, 1910.
Sanitary Contract No. 43. Lateral Sewers, District No. 29.	Sept. 11, 1909.	Wm. McCarthy & Co...	Completed April 25, 1910.
Sanitary Contract No. 44, Lateral Sewers, District No. 21.	Dec. 18, 1909.	David Peoples..........	Completed Aug. 15, 1910.
Sanitary Contract No. 45, Lateral Sewers, District No. 27.	Dec. 18, 1909.	David Peoples..........	Completed Aug. 8, 1910.
Storm Water Contract No. 7..	June 2, 1909.	Wm. McCarthy & Co...	Completed Dec. 31. 1909.
Storm Water Contract No. 8..	Sept. 11, 1909.	M. O'Herron & Co.....	Completed Dec. 31. 1909.

TABLE No. 3.

STATEMENT OF CONTRACTS LET DURING THE YEAR 1910, WITH PROPORTION OF WORK COMPLETED DECEMBER 31.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1910.
Sanitary Con. No.46, Power-house, Pump-house and Land Conduits, Back River Disp. Works.	Ryan & Reilly	Feb. 21, 1910	4,300 cu. yds. excavation for power-house, double conduits, etc. 1.535 lin. ft. excavation for single conduits. 2,000 cu. yds. overhaul. 150 cu. yds. gravel refill. 350 cu. yds. loam. 112 M. ft., B. M., sheeting, sheet-piling, etc., and lumber in foundations. 500 lin. ft. timber piles in place. 2,000 lin. ft. 4-inch to 10-inch underdrains. 3,560 cu. yds. concrete masonry. 1,500 lin. ft. reinforced concrete piles. 225 sq. yds. granolithic surface. 425,000 pounds reinforcing bars. 1,000 pounds wrought-iron work. 425 lin. ft. wrought-iron-pipe railing. Roofing, metal window frames and sash, carpenter and mill work and building hardware, for power-house. Pump-house building complete.	$76,146.00	$83,677.90	86 per cent.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1910.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1910.
Sanitary Con. No.47, Underwater Discharge Conduits, Back River Disposal Works.	B. F. Sweeten & Son	Mar. 10, 1910	6,125 lin. ft. wooden piles. 100 3-inch by 12-inch wooden caps. 5,030 lin. ft. 60-inch diameter wood-stave pipe, laid under water, complete. 5,000 pounds 1-inch galvanized, round steel conduit stirrups. 2 special underwater discharge elbows, complete in place.	$42,916.40	$44,700.00	75 per cent.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1910.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1910.
Sanitary Con. No. 48, Lateral Sewers, District 19-B.	Irwin Bros.	Feb. 28, 1910	29,000 lin. ft. 8-inch sewer. 2,450 lin. ft. 10-inch sewer. 1,250 lin. ft. 12-inch sewer. 3,800 lin. ft. 15-inch sewer. 550 lin. ft. 20-inch sewer. 500 cu. yds. rock excavation. 55 cu. yds. concrete masonry. 700 lin. ft. 4-inch and 6-inch underdrain. 300 M. ft., B. M., sheeting, shoring and bracing. 1,650 lin. ft. standard manholes. 60 lin. ft. special offset manholes. 188 manhole frames and covers. 1,350 manhole steps. 19 drop connections. 14,300 lin. ft. vitrified-pipe house-connections 2,415 branches. 825 lin. ft. vitrified-pipe standpipes. 11 lamphole frames and covers. 57 water-supply cocks in terminal manholes. 600 lin. ft. 1¼-inch pipe for water supply to terminal manholes.	$69,765.00	$73,832.75	Completed Oct. 15, 1910.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1910.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1910.
Sanitary Con. No. 49, Lateral Sewers, District No. 35.	Irwin Bros.	Feb. 28, 1910	8,990 lin. ft. 8-inch sewer. 445 lin. ft. 8-inch cast-iron-pipe sewer. 1,000 cu. yds. rock excavation. 30 cu. yds. concrete masonry. 500 lin. ft. 4-inch and 6-inch underdrain. 50 M. ft., B. M., sheeting, shoring and bracing. 365 lin. ft. manholes. 1 special manhole. 48 manhole frames and covers. 325 manhole steps. 6 drop connections. 5.110 lin. ft. vitrified-pipe house-connections. 530 branches. 200 lin. ft. vitrified-pipe standpipes. 6 lamphole frames and covers. 19 water-supply cocks in terminal manholes. 300 lin. ft. 1¼-inch pipe for water supply to terminal manholes. NOTE—The size of this contract was reduced 50 per cent. in order to comply with the terms of the Sewerage Enabling Act passed by the Legislature April 11, 1910.	$19,667.60	$20,203.99	Completed Aug. 12, 1910.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1910.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1910.
Sanitary Con. No. 50, Jones Falls Interceptor, Section No. 2.	United Engineering and Construction Co.	May 20, 1910	10,250 cu. yds. earth excavation in open trench. 300 cu. yds. earth excavation in tunnel. 200 cu. yds. rock excavation and refill. Rebuilding 45 lin. ft. 66-inch masonry storm-water drain. 650 cu. yds. embankment. 377 cu. yds. brick masonry. 4,200 cu. yds. concrete masonry. 140,000 pounds reinforcing steel. 6,500 pounds steel-wire fabric or expanded metal. 16,000 pounds structural steel. 240 lin. ft. 24-inch diameter cast-iron-pipe sewer. 2,500 lin. ft. 6-inch and 8-inch underdrain. 165 M. ft., B. M., sheeting, sheet-piling, etc., and lumber in foundations. 1,000 lin. ft. piles. 8 manhole frames and covers. 55 manhole steps.	$83,835.67	$90,275.00	69 per cent.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1910.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1910.
Sanitary Con. No. 51, Electrical and Mechanical Equipment, Sewage Disposal Works.	McCay Engineering Co.	May 21, 1910	Hydraulic turbines and governors. Head-gates and bulkheads in penstock, tail race and discharge chamber. Oil engine. Alternating current generators and exciters. Excavation and embankment. Traveling crane. Switchboards. Tile and metal conduits. Manholes. Lead-covered cable. Interior wiring and lighting fixtures. Arc lighting circuit. Float control apparatus. Motors and motor-generators. Transformers. Deep well pumping head. Centrifugal pumps. Cast and wrought iron pipe and fittings, valves and valve boxes. Structural steel and iron work, etc., etc.	$42,440.00	$45,574.00	47 per cent.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1910.
Sanitary Con. No. 52, Lateral Sewers, District No. 19-A, etc.	Wm. McCarthy & Co.	June 9, 1910	25,800 lin. ft. 8-inch sewer.	$105,878.10	$110,005.05	82 per cent.
			2,500 lin. ft. 10-inch sewer.			
			1,600 lin. ft. 12-inch sewer.			
			380 lin. ft. 22-inch sewer.			
			1,895 lin. ft. 24-inch sewer.			
			830 lin. ft. 27-inch concrete sewer.			
			700 cu. yds. rock excavation.			
			45 cu. yds. sewer-brick masonry.			
			860 cu. yds. concrete masonry.			
			5,000 lin. ft. 4-inch to 8-inch underdrain.			
			855 M. ft., B. M., sheeting, sheet-piling, etc., and lumber in foundations.			
			1,600 lin. ft. standard manholes.			
			100 lin. ft. special offset manholes.			
			175 manhole frames and covers.			
			1,100 manhole steps.			
			37 drop connections.			
			15,900 lin. ft. vitrified-pipe house-connections.			
			2,300 branches.			
			20 cast-iron bases for 6-inch standpipes.			
			23 bevel connections.			
			1 250 lin. ft. vitrified-pipe standpipes.			
			20 lamphole frames and covers.			
			78 water-supply cocks for terminal manholes.			
			1,000 lin. ft. 1¼-inch pipe for water supply to terminal manholes.			

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1910.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1910.
Sanitary Con. No. 53, Lateral Sewers, District No. 25, etc.	D. V. Ault & Co	June 23. 1910	16,200 lin. ft. 8-inch sewer. 510 lin. ft. 10-inch sewer. 55 cu. yds. concrete masonry. 700 lin. ft. 4-inch and 6-inch underdrain. 300 M. ft., B. M., sheeting, shoring and bracing. 1,000 lin. ft. standard manholes. 28 lin. ft. special offset manholes. 117 manhole frames and covers. 800 manhole steps. 12 drop connections. 4,570 lin. ft. vitrified-pipe house-connections. 1,405 branches. 190 lin. ft. vitrified-pipe standpipes. 17 lamphole frames and covers. 45 water-supply cocks for terminal manholes. 500 lin. ft. 1¼-inch pipe for water supply to terminal manholes.	$33,942.20	$34,431.30	Completed Dec. 7, 1910.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1910.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1910.
Sanitary Con. No. 54, Trunk Sewers, District No. 48...	W. H. & C. F. Thompson.	July 28, 1910	6,450 cu. yds. earth excavation and refill. 500 cu. yds. refill in completed trenches. 3,525 cu. yds. rock excavation and refill. 2,350 lin. ft. 10-inch sewer. 12 lin. ft. 12-inch sewer. 3,630 lin. ft. 15-inch sewer. 900 lin. ft. 18-inch sewer. 1,000 lin. ft. 22-inch sewer. 10 lin. ft. 24-inch sewer. 800 cu. yds. embankment. 100 cu. yds. concrete masonry. 7,550 lin. ft. 4-inch to 8-inch underdrain. 20 M. ft., B. M., sheeting, sheet-piling, etc. 450 lin. ft. manholes. 37 manhole frames and covers. 300 manhole steps. 2 lamphole frames and covers. 36 drop connections. 370 branches. 100 lin. ft. vitrified-pipe standpipes. 25 lin. ft. vitrified-pipe lampholes. 33 connections built into manholes. NOTE—This contract was for the completion of the work covered by Sanitary Contract No. 41, which was abandoned by the contractor when 72 per cent. completed.	$41,128.15	$45,074.65	81 per cent.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1910.
Sanitary Con. No. 55, Lateral Sewers, District No. 14.	B. F. Sweeten & Son.	Sept. 16, 1910	18,000 lin. ft. 8-inch sewer. 3,300 lin. ft. 10-inch sewer. 950 lin. ft. 12-inch sewer. 675 lin. ft. 15-inch sewer. 30 lin. ft. 30-inch concrete sewer. 520 cu. yds. concrete masonry. 6,000 lin. ft. 4-inch to 8-inch underdrain. 580 M. ft., B. M., sheeting, sheet-piling, etc. 1,250 lin. ft. standard manholes. 30 lin. ft. special offset manholes. 1 special manhole at Light and York sts. 115 manhole frames and covers. 1,050 manhole steps. 13 drop connections. 10,300 lin. ft. vitrified-pipe house-connections. 1.435 branches. 325 lin. ft. vitrified-pipe standpipes. 25 lamphole frames and covers. 45 water-supply cocks at terminal manholes. 600 lin. ft. 1¼-inch pipe for water supply to terminal manholes.	$67,671.25	$79,628.75	38 per cent.
Sanitary Con. No. 56, Coal and Ash Conveying Plant, Sewage Pumping Station.	Dietz Eng. Co.	Sept. 20, 1910	Coal unloading machinery and gravity bucket conveyor for coal and ashes, complete.	$17,360.00	$19,800.00	Work not started.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1910.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1910.
Sanitary Con. No. 57, Lateral Sewers, District No. 34-A.	Whiting-Middleton Construction Co..	Nov. 10, 1910	21,500 lin. ft. 8-inch sewer. 550 lin. ft. 10-inch sewer. 270 lin. ft. 12-inch sewer. 645 lin. ft. 22-inch sewer. 2,615 lin. ft. 27-inch brick and concrete sewer. 750 cu. yds. rock excavation. 140 cu. yds. sewer-brick masonry. 620 cu. yds. concrete masonry. 1,500 lin. ft. 4-inch and 6-inch underdrain. 300 M. ft., B. M., sheeting, shoring and bracing. 1,650 lin. ft. standard manholes. 10 lin. ft. special offset manholes. 2 special drop manholes. 178 manhole frames and covers. 1,325 manhole steps. 12 drop connections. 7,600 lin. ft. vitrified-pipe house-connections. 1,296 branches. 50 straight or bevel connections. 10 6-inch cast-iron bases for standpipes. 220 lin. ft. vitrified-pipe standpipes. 10 lamphole frames and covers. 57 water-supply cocks for terminal manholes. 500 lin. ft. 1¼-inch pipe for water supply to terminal manholes.	$85,461.08	$104,578.00	26 per cent.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1910.
Sanitary Con. No. 58, McMechen Street Interceptor.	McCay Engineering Co.	Nov. 23, 1910	1,575 lin. ft. 20-inch sewer. 1,200 lin. ft. 22-inch sewer. 1,750 lin. ft. 24-inch sewer. 264 lin. ft. 50-inch concrete sewer. 565 cu. yds. excavation for cast-iron pipe. 1,460 lin. ft. 16-inch cast-iron pipe. 500 cu. yds. excavation below sub-grade. 200 cu. yds. rock excavation. 25 cu. yds. sewer-brick masonry. 665 cu. yds. concrete masonry. 2,500 lin. ft. 4-inch to 8-inch underdrain. 360 M. ft., B. M., sheeting, sheet-piling, etc., and lumber in foundations. 300 lin. ft. standard manholes. 32 manhole frames and covers. 1 lamphole frame and cover. 250 manhole steps. 4 special manholes. 19 drop connections. 1,110 lin. ft. vitrified-pipe house-connections. 148 branches. 27 bevel connections, 6-inch to 18-inch. 195 lin. ft. vitrified-pipe standpipes.	$43,652.20	$44,864.35	18 per cent.
Sanitary Con. No. 59, Electric Wiring, Sewage Pumping Station.	Central Electric Co.	Dec. 16, 1910	Electric Wiring and Lighting Fixtures in Sewage Pumping Station Building.	$3,526.00	$3,958.51	Work not started.

TABLE No. 3—*Continued.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1910.

CONTRACT.	NAME OF CONTRACTOR.	DATE OF CONTRACT.	PRINCIPAL ITEMS OF WORK.	LOWEST BID.	NEXT TO LOWEST BID.	PROPORTION OF WORK COMPLETED DEC. 31, 1910.
Storm-Water Con. No. 9	David Peoples.	Mar. 26, 1910	3,500 cu. yds. excavation for 72-inch drain. 16,465 cu. yds. excavation for 69-inch drain. 3,275 lin. ft. inlet connections. 245 cu. yds. brick masonry. 2,456 cu. yds. concrete masonry. 3,725 lin. ft. underdrain. 315 M. ft., B. M., sheeting, shoring, etc., and lumber in foundations. 2,725 cu. yds. rock excavation. 266 cu. yds. excavation for bellmouths and drop wells. 71 manhole frames and covers. 527 lin. ft. manholes. 91 lin. ft. drop wells. 307 galvanized wrought-iron manhole steps. 130 inlets. 96 flushed and depressed heads for inlets. 210 lin. ft. new granite curb. 45 lin. ft. curb removed and reset. 50 sq. yds. repaving. 5 cu. yds. dimension-stone masonry. Removing Existing Eden Street Storm-Water Drains. 30 lin. ft. 48-inch interior drain.	$127,556.85	$134,184.90	74 per cent.

TABLE No. 3—*Concluded.*

STATEMENT OF CONTRACTS LET DURING THE YEAR 1910.

Contract.	Name of Contractor.	Date of Contract.	Principal Items of Work.	Lowest Bid.	Next to Lowest Bid.	Proportion of Work Completed Dec. 31, 1910.
Storm-Water Con. No. 10.	Geo. F. Beavin	July 29, 1910	780 lin. ft. 42-inch circular drain. 120 lin. ft. 18-inch circular drain. 55 lin. ft. inlet connections. 10 cu. yds. brick masonry. 15 cu. yds. concrete masonry. 1,000 pounds steel bars for reinforcing concrete. 500 lin. ft. 6-inch underdrain. 20 M. ft., B. M., sheeting, shoring, etc., and lumber in foundations. 15 cu. yds. excavation for bellmouths. 4 manhole frames and covers. 30 lin. ft. manholes. 20 galvanized wrought-iron manhole steps. 6 inlets. 4 flush heads for inlets. 25 lin. ft. new granite curb. 20 lin. ft. curb removed and reset. 10 sq. yds. repaving.	$7,344.50	$8,854.75	Completed Dec. 24, 1910.

TABLE No. 4.

LENGTHS OF SANITARY SEWERS OF THE VARIOUS SIZES AND MATERIALS CONSTRUCTED TO DECEMBER 31, 1910.

SIZE.	MATERIALS.	CONSTRUCTED PREVIOUS TO 1910. LINEAR FEET.	CONSTRUCTED IN 1910. LINEAR FEET.	TOTAL TO DEC. 31, 1910. LINEAR FEET.
11′ 0″ x 12′ 3″ Horseshoe	Brick and Concrete	26,351.80		26,351.80
10′ 9″ x 12′ 0″ Horseshoe	Brick and Concrete	3,879.21		3,879.21
100″ Diameter	Brick and Concrete	5,109.28		5,109.28
99″ Diameter	Brick and Concrete	4,610.45		4,610.45
84″ Diameter	Brick and Concrete	305.00		305.00
80″ Diameter	Brick and Concrete	727.00		727.00
76″ Diameter	Brick and Concrete	633.60		633.60
75″ Diameter	Brick and Concrete	234.00	1,355.92	1,589.92
74″ Diameter	Brick and Concrete	1,931.00		1,931.00
66″ Diameter	Brick and Concrete	2,011.67		2,011.67
64″ Diameter	Brick and Concrete		1,423.00	1,423.00
60″ Diameter	Brick and Concrete	5,151.23		5,151.23
57″ Diameter	Brick and Concrete	742.90		742.90
56″ Diameter	Brick and Concrete		279.00	279.00
55″ Diameter	Brick and Concrete	963.88		963.88
52″ Diameter	Brick and Concrete	893.00		893.00
51″ Diameter	Brick and Concrete	2,054.98		2,054.98
50″ Diameter	Brick and Concrete		454.00	454.00
48″ Diameter	Brick and Concrete	869.94		869.94
45″ Diameter	Brick and Concrete	1,440.00		1,440.00
42″ Diameter (Force Main)	Cast-iron Pipe	10,440.00		10,440.00
36″ Diameter	Brick and Concrete	63.61		63.61

LENGTHS OF SANITARY SEWERS OF THE VARIOUS SIZES AND MATERIALS CONSTRUCTED TO DECEMBER 31, 1910.

SIZE.	MATERIALS.	CONSTRUCTED PREVIOUS TO 1910. LINEAR FEET.	CONSTRUCTED IN 1910. LINEAR FEET.	TOTAL TO DEC. 31, 1910. LINEAR FEET.
30″ Diameter	Brick and Concrete	104.20		104.20
27″ Diameter	Brick and Concrete	25.33	822.20	847.53
24″ Diameter	Terra-Cotta Pipe	2,221.54	3,787.50	6,009.04
24″ Diameter	Cast-iron Pipe		285.36	285.36
22″ Diameter	Terra-Cotta Pipe	2,130.00	5 477.42	7,607.42
20″ Diameter	Terra-Cotta Pipe	1,901.45	523.89	2,425.34
18″ Diameter	Terra-Cotta Pipe	2,960.35	440.00	3,400.35
16″ Diameter	Cast-iron Pipe		218.00	218.00
15″ Diameter	Terra-Cotta Pipe	2,660.42	9,246.16	11,906.58
12″ Diameter	Terra-Cotta Pipe	5,788.97	6,065.17	11,854.14
10″ Diameter	Terra-Cotta Pipe	8,238.31	15 662.50	23,900.81
8″ Diameter	Terra-Cotta Pipe	118,873.25	141,384.36	260,257.61
8″ Diameter	Cast-iron Pipe	60.00	432.40	492.40
Total Length		213,376.37	187,856.88	401,233.25
House Connections	Terra-Cotta and Cast-iron Pipe	87,776.85	71,113.97	158,890.82
Grand Total		301,153.22	258,970.85	560,124.07

Manholes built to December 31, 1910	1,816
Lampholes built to December 31, 1910	166
Spurs placed to December 31, 1910	20,140

LENGTH OF STORM-WATER DRAINS OF THE VARIOUS SIZES AND MATERIALS CONSTRUCTED TO DECEMBER 31, 1910.

SIZE.	MATERIALS.	CONSTRUCTED PREVIOUS TO 1910. LINEAR FEET.	CONSTRUCTED IN 1910. LINEAR FEET.	TOTAL TO DEC. 31, 1910. LINEAR FEET.
Double Rectangular, 84″ x 60″	Concrete and Brick (Reinf.)	108.30		108.30
Double Rectangular 69″ x 50″	Concrete and Brick (Reinf.)	2,856.91		2,856.91
Rectangular, 66″ x 45″	Reinforced Concrete	1,470.30		1,470.30
Rectangular, 60″ x 42″	Concrete and Brick (Reinf.)	785.90		785.90
Rectangular, 60″ x 30″	Concrete and Brick (Reinf.)	76.79		76.79
138″ x 132″ Horseshoe	Concrete and Brick	125.13		125.13
114″ Horseshoe	Concrete and Brick	244.65		244.65
114″ Diameter	Concrete and Brick	1,112.69		1,112.69
96″ Diameter	Concrete and Brick	3,451.55		3,451.55
72″ Diameter	Concrete and Brick		1,250.00	1,250.00
69″ Diameter	Concrete and Brick		835.00	835.00
66″ Diameter	Concrete and Brick	169.35		169.35
62″ Diameter	Concrete and Brick (Reinf.)	245.64		245.64
60″ Diameter	Concrete and Brick	163.49		163.49
54″ Diameter	Concrete and Brick	550.32		550.32
48″ Diameter	Concrete	1,054.83		1,054.83
48″ Diameter	Concrete and Brick	702.34		702.34
48″ Diameter	Brick	1,453.27		1,453.27
48″ Diameter	Cast-Iron Pipe	41.99		41.99
42″ Diameter	Concrete	2 282.52		2,282.52
42″ Diameter	Concrete and Brick	911.24	790.36	1,701.60
42″ Diameter	Brick	1,689.96		1,689.96
42″ Diameter	Cast-Iron Pipe	34.35		34.35

TABLE No. 5—*Concluded.*

LENGTH OF STORM-WATER DRAINS OF THE VARIOUS SIZES AND MATERIALS CONSTRUCTED TO DECEMBER 31, 1910.

SIZE.	MATERIALS.	CONSTRUCTED PREVIOUS TO 1910. LINEAR FEET.	CONSTRUCTED IN 1910. LINEAR FEET.	TOTAL TO DEC. 31, 1910. LINEAR FEET.
36" Diameter	Concrete	6,055.19		6,055.19
36" Diameter	Concrete and Brick	6,698.83	3.16	6,701.99
36" Diameter	Brick	600.81		600.81
33" Diameter	Concrete and Brick	3,478.00	589.37	4,067.37
33" Diameter	Brick	38.23		38.23
30" Diameter	Concrete	4,522.68		4,522.68
30" Diameter	Concrete and Brick	6,087.72	363.00	6,450.72
30" Diameter	Brick	183.50		183.50
30" Diameter	Cast-Iron Pipe	914.33		914.33
24" Diameter	Terra-Cotta Pipe	25,833.14	2,240.00	28,073.14
24" Diameter	Cast-Iron Pipe	494.13		494.13
20" Diameter	Terra-Cotta Pipe	8,206.26	1,490.00	9,696.26
20" Diameter	Cast-Iron Pipe	371.63		371.63
18" Diameter	Terra-Cotta Pipe	21,682.68	1,653.87	23,336.55
15" Diameter	Terra-Cotta Pipe	19,672.77	1,010.00	20,682.77
12" Diameter	Terra-Cotta Pipe	5,245.72	525.00	5,770.72
30" Diameter (Double Line)	Cast-Iron Pipe	645.17		645.17
Inlet Connections	Terra-Cotta Pipe	28,037.43	2,917.67	30,955.10
Totals		158,299.74	13,667.43	171,967.17
Inlets and Catch Basins		997.00	93.00	1,090.00
Manholes and Drop Wells		808.00	70.00	878.00